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# MYCOLOGIA

OFFICIAL ORGAN OF THE MYCOLOGICAL SOCIETY OF AMERICA

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Vol. XXXVI JANUARY-FEBRUARY, 1944

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No. 1

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# MYCOLOGIA

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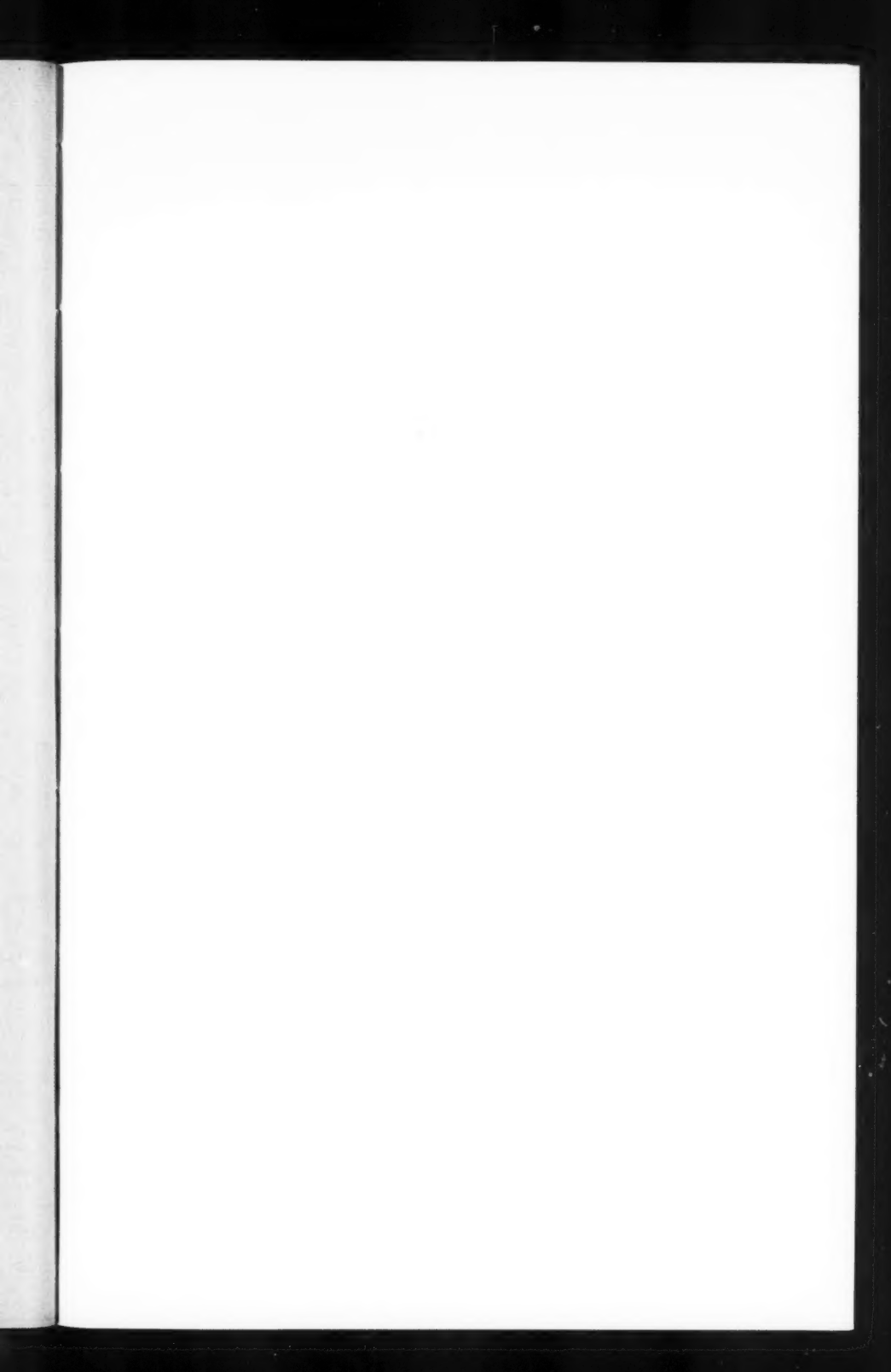
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*Bottom row*—R. D. Rands, P. W. Graff, L. H. L.

This picture was taken at an ho





*FIRST MEETING OF THE MYCOLOGICAL SOCIETY OF AMERICA - TRAPHIMORE, 1907*

Bender, Don Creager, Michael Levine, G. A. Ledingham, Philip Rusden, M. L. Lohman, I. Elisabeth  
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 s taken at an hour which conflicted with an important session of another society and, consequently,



man, I. Elisabeth Astrom, G. E. Thompson, Norman Conant, Kenneth Raper, D. L. Gill, Don M. Benedict.  
 ton, George L. Zundel, J. C. Gilman, H. S. Cunningham, Cyril O. Bratley, Myron P. Backus, Grace E.

I. M. Fitzpatrick, H. S. Jackson, A. H. R. Buller, E. B. Mains, J. N. Couch.

and, consequently, it does not include all the mycologists who were present at Atlantic City.

# MYCOLOGIA

OFFICIAL ORGAN OF THE MYCOLOGICAL SOCIETY OF AMERICA

VOL. XXXVI JANUARY-FEBRUARY, 1944 No. 1

## THE FIRST TWELVE YEARS OF THE MYCOLOGICAL SOCIETY OF AMERICA<sup>1</sup>

HARRY MORTON FITZPATRICK

(WITH GROUP PHOTOGRAPH)

At the second winter meeting of the Mycological Society of America, held at Boston, December 28-30, 1933, the office of Historian was established. An amendment to the Constitution was adopted there which reads: "The Council shall name a Historian to serve for an indeterminate period of years. It shall be the duty of the Historian to accumulate and preserve facts, papers, photographs, and other materials pertinent to a permanent historical record of the Society. The Historian shall not become a member of the Council by virtue of his office as Historian."

The office remained unfilled until late in December, 1936, when the writer became its first incumbent. Having served as Secretary-Treasurer of the Society during its first four years, he was already in possession of detailed records of that period. Also, he was thoroughly conversant with the viewpoints and events which had led to the formation of the new organization, and had just emphasized his interest in historical matters by giving, as Retiring President, an address entitled, "Historical Background of the Mycological Society of America" (*Mycologia* 29: 1). In accepting appointment to the new office and in giving considera-

<sup>1</sup> First report of the Society Historian, covering the years 1931-1943.

[*MYCOLOGIA* for November-December (35: 595-682) was issued December 1, 1943]

tion to the responsibilities involved, it seemed to him that the preservation of materials for the Archives should be regarded as constituting only one of his logical functions. It appeared desirable, in addition, that a complete and orderly record be kept of the vital statistics and essential activities of the organization, and that occasionally, perhaps at ten- or fifteen-year intervals, formal reports be published in which the scattered data of interest to the membership and posterity would be brought together. It was felt that a series of such reports, prepared by successive Historians, would constitute an index to accumulating materials of historical significance, some of which might otherwise be lost. It is hoped that some future Historian, possessed of the abilities that this distinguished title connotes, will be stimulated by the availability of these records to prepare a history of mycological endeavor and attainment in America.

Our Society is now in its twelfth year. Its tenth annual winter meeting was held at Dallas, Texas, in December, 1941. The meeting scheduled for New York City the following winter was cancelled at the request of the Federal Office of Transportation. Probably, we shall not be brought together again before the end of the war. In this interval of cessation of normal Society activities an especially favorable opportunity has been presented for preparation of a statement covering the affairs of our organization throughout somewhat more than the first decade of its existence. In attempting to make the report complete and accurate, we have felt that some of our contemporaries would approve of its preparation and find it a convenient source of reference. Though it is not unlikely that some others will regard the data incorporated as inconsequential, we have found justification for their inclusion in the realization that, had similar records of the activities of earlier groups of mycologists been carefully preserved, they would now be most valuable and interesting.

#### ARCHIVES

The task of accumulating photographs, letters, miscellaneous printed matter and other materials for permanent preservation in the Archives of the Society has been seriously undertaken. In 1937, a note was placed in *Mycologia* (29: 650) requesting

members to file all such desiderata with the Historian, especially photographs of groups and individuals in attendance at the various meetings. Though there has been a reasonably satisfactory response, many more such items should be deposited regularly.

At present the materials composing the Archives fill five volumes and occupy eight or ten inches of shelf space. The volumes have been bound uniformly, and are arranged as nearly as possible in chronological sequence. As the years pass it is hoped that others will be added to them. As such materials are largely irreplaceable, it has seemed to us that they should not pass from the hands of the Historian into those of his successors, lest in time through mishap they be lost. The Council has concurred in this viewpoint, and with its approval they have been placed on permanent deposit in the Library of the New York Botanical Garden with the definite understanding that, though available for consultation, they are not to be loaned.<sup>2</sup> Director William J. Robbins has accepted the volumes, and expressed the opinion that "as time passes original material of this type will become increasingly important."

The first volume is composed of the replies received to the questionnaire sent out by H. H. Whetzel in July 1931, in which he sought the opinion of American mycologists with respect to the desirability of establishing an independent mycological society to replace the Mycological Section of the Botanical Society of America. All the replies received are included. They present clearly the viewpoints held at that time by American botanists, mycologists and plant pathologists with respect to the need for such an organization. The vote was overwhelmingly in the affirmative, and led to the formation of the Society the following December. A critical tabulation of the vote was presented and discussed by the writer in *Mycologia* (29: 21). This volume of the Archives contains a similar resumé.

<sup>2</sup> In this action we have followed the precedent established by the Botanical Society of America in depositing at the New York Botanical Garden the two old volumes constituting the Proceedings and Register of the earlier Botanical Club of the American Association for the Advancement of Science (*Mycologia*, 29: 9). We have felt that such materials are more likely to be permanently preserved in an exclusively botanical library.

During the latter part of 1932, before and during the formal organization of the Society at Atlantic City, 243 individuals were enrolled as charter members. In late December, following the adoption of *Mycologia* as our official organ of publication, the Council ruled that all personal subscribers to the journal who should express the desire to join the Society during the early months of 1933 should also be included. Thirty-six did so. Though a relatively small number of individuals, assembled at New Orleans in December, 1931, had voted the Society into existence, the charter membership as thus defined embraces 279 names (*Mycologia* 26: 108; 29: 23). The second volume of the Archives includes only material concerned with the charter membership. It is composed chiefly of membership application blanks arranged in alphabetical order. These bear the signatures of most of the mycologists of this country and Canada.

The third volume is composed almost entirely of letters. These were written during the years 1931 to 1943 inclusive, but deal chiefly with the early days of the Society and with events which led to its formation. They total several hundred. They were written mostly by officers of the organization and by others who from time to time took an active part in its affairs. They have been arranged chronologically, and if read in that order reveal clearly the activities and influence of a number of individuals. Discrimination has been used in their selection, in the desire to avoid inclusion of personal matters or harmful materials. Various inclosures are scattered among them. In consequence, the volume contains a complete set of the mimeographed sheets distributed by the Secretary-Treasurer during the first year of the Society's existence, when funds were not yet available for printing. Similar mimeographed material, provided at the summer forays, is also included. The volume contains the preliminary draft of our Constitution and By-Laws and several tentative drafts of the contract between the Society and the New York Botanical Garden, framed while negotiations were under way looking toward the adoption of *Mycologia* as our official organ. The contract as finally drawn up, bearing the signatures of Director Elmer D. Merrill and the Secretary-Treasurer, accompanies their correspondence.

The fourth volume consists wholly of printed matter. It includes programs of the meetings, copies of the six Year Books issued for 1934-1939, membership lists printed subsequently in *Mycologia*, reprints of the presidential addresses, a set of the accompanying photographs of the Presidents, and other miscellaneous items such as amendments to the Constitution and reports on summer forays.

The fifth volume is of the nature of a portfolio and has been provided as a repository for photographic prints, picture post cards, newspaper clippings, sample ballots, and other miscellaneous written and printed matter of historical interest. The meetings of the Society constitute the units in connection with which this material has been arranged. The portfolio includes large, heavy, manila envelopes, one for each meeting to date, and in each of these the mementos of a single meeting have been filed. The writer is convinced that such an accumulation will, in time, have appreciable value. As to its interest for the younger generation of mycologists there can be no question. At the summer meeting of 1938, at Duchesnay, Quebec, and at that of 1939, at Gatlinburg, Tennessee, enlarged photographs were posted showing the groups in attendance at earlier forays. The keen interest with which these were scrutinized left no doubt of the desirability of preserving such records for the information and pleasure of those who shall follow after us. Already these pictures contain faces of beloved and distinguished members who will not again greet us at winter meeting or summer foray.

#### THE FIRST YEAR

The Mycological Society of America was founded at New Orleans, December 29, 1931, at the last business session of the Mycological Section of the Botanical Society of America, which thus terminated its own existence (*Mycologia* 24: 246; *Science* 75: 159). The action was taken in Room 213 of the Science Building of Tulane University, F. J. Seaver, chairman of the Section, presiding at the session. The group then elected an organizing committee of five members to serve during the following year. Its chairman, Wm. H. Weston, Jr., was designated the first President of the Society, the writer was selected to serve as



Secretary-Treasurer, and the other three members were chosen as Councilors. During 1932, this committee handled various problems of organization. An invitation was sent out urging all persons interested in the fungi to become charter members, and arrangements were made for holding the first meeting of the Society at Atlantic City in December in affiliation with the American Association for the Advancement of Science (*Mycologia* 24: 515). A tentative contract was drawn up with the New York Botanical Garden providing for adoption of *Mycologia* as the official organ of publication, and in November a mimeographed program (*Mycologia* 29: 650) was mailed in which an open business session for final organization of the Society was announced. All persons who had asked to be listed as charter members were invited to take an active part in the proceedings.

#### WINTER MEETINGS

The first winter meeting of the Society was held, December 28-30, 1932, at Atlantic City, with headquarters at the Traymore Hotel. At the open business session, under the chairmanship of President Weston, the organization of the Society was quickly accomplished with essentially unanimous votes on all motions introduced. The Constitution and By-Laws were approved, and officers for 1933 were elected (*Mycologia* 25: 66, 152). *Mycologia* was adopted and a new editorial board was chosen. Its members then elected F. J. Seaver editor-in-chief. The mycological sessions were well attended. The President gave as his retiring address a biographical sketch and eulogy of Roland Thaxter.<sup>3</sup>

Nine other winter meetings have been held, none of them having, of course, as great historical interest as the first. The mycological programs, throughout the decade, at times have contained papers of exceptional interest and importance. Publication of abstracts of the papers presented at the meetings has been successfully opposed from the beginning by the taxonomists who have experienced difficulties resulting from inclusion of new generic and specific names in such abstracts. It seems to the Historian, nevertheless, that some record of the content of papers

<sup>3</sup> Though Professor Thaxter had voted in favor of the formation of the Society, his death occurred in April, 1932, before he had become a member.



presented at the meetings should be preserved. As the programs have not been published in *Mycologia*, and as many members doubtless discard the copies provided in pamphlet form for use at the meetings, it has been especially desirable that a complete set of the latter be incorporated in the Archives.

Looking back over the programs of ten successive winter meetings, an increasing interest in certain phases of mycology and in various groups of the fungi is evident. Medical mycology has assumed a more prominent position, and a closer coöperation between the fields of medicine and taxonomic mycology has gradually developed. An increase in the number of students interested chiefly in the Phycomycetes has caused the scheduling in some years of a session given over exclusively to papers dealing with members of that group. Indeed, when there are so many competing, simultaneous programs of affiliated organizations, segregation of papers dealing with a limited interest has evident advantages. In works no hardship on members whose interests are broad, and will probably be increasingly evident in the sessions of the future.

At several meetings, significant business items have been handled. At Indianapolis in December 1937, the By-Laws (section 5) were amended to prohibit unauthorized use of the name of the Society for "advertising or other business ventures." At the last meeting, held at Dallas in 1942, article 5 of the Constitution was changed to provide that the Council shall contain four Councilors instead of two. It was designated also that two of these shall be from west of the Mississippi River and two from east of it, and that one from each region shall be elected annually.

From the beginning, it has been customary for the Retiring President to address the Society at the close of its open business session on the first day of the annual winter meeting. The address, accompanied by his portrait, is later printed in *Mycologia*. In Table I, a list of the winter meetings is given. In it the reference which follows the name of the President is to his address. The citations which follow the name of the city refer to official announcements and reports. In these the exact dates of the meetings are given, the headquarters hotels are named, and information concerning the sessions is provided.

TABLE I—WINTER MEETINGS

Year	City	President
1932	Atlantic City (Mycol. 24: 515; 25: 66, 152).	Wm. H. Weston Jr. <sup>4</sup> (Mycol. 25: 69).
1933	Boston (Mycol. 26: 197).	C. L. Shear (Mycol. 26: 201; 29: 732).
1934	Pittsburgh (Mycol. 27: 225).	H. S. Jackson (Mycol. 27: 553).
1935	St. Louis (Mycol. 28: 197).	B. O. Dodge (Mycol. 28: 399).
1936	Atlantic City <sup>4</sup> (Mycol. 28: 494).	H. M. Fitzpatrick (Mycol. 29: 1).
1937	Indianapolis (Mycol. 29: 651, 732).	John Dearness (Mycol. 30: 111, 692).
1938	Richmond <sup>5</sup>	L. O. Overholts (Mycol. 31: 629).
1939	Columbus <sup>6</sup>	H. H. Whetzel <sup>7</sup>
1940	Philadelphia <sup>8</sup>	D. H. Linder (Mycol. 33: 453).
1941	Dallas <sup>9</sup>	E. A. Bessey (Mycol. 34: 355).

<sup>4</sup> An outstanding feature of the second Atlantic City meeting, for some of the members in attendance, was a trip, spontaneously arranged, to a nearby mycological shrine, the old homestead of Job Bicknell Ellis at Newfield, New Jersey. An account of the trip with photographs of the house and the group which visited it appeared in *Mycologia* (29: 268).

<sup>5</sup> As reports on the meetings of 1938–1941 were not published, information concerning them should be sought in the programs. Also see *Year Book for 1939 and Mycologia* 33: 670.

<sup>6</sup> The portrait of President Weston does not accompany his address in *Mycologia*. It appeared the following year in connection with a eulogy of him prepared by F. A. Wolf (*Mycologia* 26: 113).

<sup>7</sup> President Whetzel was prevented by illness from preparing an address or attending the meeting. In his absence Vice-President Linder occupied the chair and gave an address (*Mycologia* 32: 419). Professor Whetzel's portrait appears as the frontispiece in volume 32 of *Mycologia*.

TABLE II—SUMMER FORAYS

1933	Highlands, North Carolina (Mycol. 25: 233, 330, 550; 26: 195).
1934	Seventh Lake near Inlet, New York (Mycol. 26: 271, 377; 27: 323).
1935	Ithaca, New York (Mycol. 27: 327; 28: 98).
1936	Mountain Lake, Virginia (Mycol. 28: 297; 30: 365).
1937	Hanover, New Hampshire (Mycol. 29: 553; 30: 476).
1938	Duchessay, Quebec (Mycol. 30: 243; 31: 233, 728; 32: 264).
1939	Gatlinburg, Tennessee (Mycol. 31: 234, 371, 33; 570).
1940	Millinocket, Maine (Mycol. 32: 417; 34: 226).
1941	Macdonald College, Quebec (Mycol. 33: 334; 34: 350).

## FORAYS

At the organization of the Society at Atlantic City there was a very definite sentiment in favor of holding summer meetings. It was urged also that these be primarily of the nature of field excursions or collecting expeditions. Influenced by this viewpoint, the Council empowered the Vice-President to arrange for the first of these meetings for the summer of 1933. It was held in August at Highlands, North Carolina, was a successful and pleasant occasion, and established a pattern which has since been followed. Borrowing the name used by the British Mycological Society, the Highlands meeting was called the Mycological Foray. The name was not unfavorably received, and has been applied to all the following summer meetings. On the occasion of these forays, formal programs, usual at scientific assemblages, with presentation of papers based on the results of research, have been avoided. Morning excursions into the fields and forest are commonly followed by afternoon sessions in the laboratory. Identifications of collections are made for future listing in *Mycologia*, and the more interesting finds are preserved for deposit in the collectors' herbaria. As national authorities on various groups of fungi are usually in attendance, the younger students are afforded an exceptional opportunity for valuable contacts. Personal association, with exchange of opinions on fresh specimens at the time of their collection, is especially valuable to individuals engaged in the study of the same group of forms. Some students bring to the foray extensive collections of notes, photographs, and specimens for use in making comparisons with freshly collected materials. In the aggregate a considerable number of books are usually available, and, though the laboratory facilities are sometimes not wholly adequate, much worthwhile study is nevertheless accomplished.

Members attending the foray commonly come with wife, children, or friends. This gives the occasion a distinctly social aspect to which many look forward with considerable anticipation. As most of those who attend come in the family automobile, an interesting tour to points of non-mycological interest is often combined with the trip to the foray. In consequence of

these features the summer meeting has a value and charm not inherent in the winter program.

In selecting the place of meeting it has been necessary to keep in mind not only the desire for good collecting and a satisfactory laboratory but also the need for adequate facilities for feeding and housing such a gathering. Though primitive conditions in the wilds are satisfactory to some of the younger and more rugged collectors, they are distasteful to others. The majority who attend are willing to drive several hundred miles to reach the meeting place, but selection of more remote collecting grounds results in poor attendance. This has limited the choice thus far to the eastern United States and adjacent Canada. In the summer of 1938, headquarters were established at the Forest Rangers School at Duchesnay, Quebec, about 20 miles north of the City of Quebec. The following August the meeting was held at Gatlinburg, Tennessee, in the extreme eastern end of the State in the Great Smoky Mountains National Park. These two points mark the limits, north and south, of the territory within which all the forays have been held. In the future, in consideration of the expressed wish of some members who live a considerable distance from the Atlantic seaboard, the attempt should perhaps be made to hold an occasional foray in the Middle West, Far West, or Deep South. Nine mycological forays were held in the nine successive summers of the years 1933-1941 inclusive. War time limitations on private automobile travel and other means of transportation made it undesirable to attempt to hold meetings in 1942 and 1943.

It has been customary to print in *Mycologia* a statement of the plans for each coming foray, and to provide a report at its close in which a list of the fungi collected is included. These articles contain much detailed information of special interest to those who attend these summer meetings. As we have cited all of them in Table II, inclusion here of detailed discussion of individual forays is unnecessary.

#### MEMBERSHIP LISTS

Near the beginning of this paper, in the discussion of the Archives, a paragraph is included which provides information

concerning the charter membership. A list of the charter members, unaccompanied by addresses, was printed in *Mycologia* in 1934 (26: 108). It includes 279 names.

Following the organization of the Society in December, 1932, a year elapsed before sufficient funds had accumulated to defray the expense of printing an address list. In April, 1934, the first Year Book was distributed. In it, each member's name was given, accompanied by his title, address, and mention of his special mycological interest. The booklet also contained the text of the Constitution and By-Laws, the contract with the New York Botanical Garden concerning *Mycologia*, and the annual financial statement of the Secretary-Treasurer. The officers of the Society for 1932, 1933, and 1934 were listed, and a brief statement concerning the various meetings held up to that date was included. The total membership had then grown to three hundred and fifteen. Five additional Year Books were prepared for the years 1935-1939 inclusive. Except that the color of the cover was changed annually, they correspond rather closely with the first in content and aspect.<sup>8</sup> As a source of ready reference the little volume was a very useful addition to the desk of the American mycologist. However, as its annual preparation consumed considerable time and involved appreciable expenditure it was discontinued. In October, 1940, the Secretary-Treasurer mailed a statement to the members which reads: "The council has decided that instead of publishing a year-book each year the same list of members will be published once every three years in *Mycologia*. In this complete list the member's name, field of interest or research, and address will be published as in the yearbook. This list will appear in *Mycologia* sometime during 1941 and the necessary data will be called for later. However, interim lists of new members and changes of address will be published in the off years."

The first address list published under the new plan appeared in *Mycologia* (33: 670) in December, 1941, and was designated "Directory 1940-1941." The content is essentially the same as that of the Year Book except that an additional geographical

<sup>8</sup> The cover of the booklet for 1934 was designed by Don B. Creager. The drawing on those which followed was made by W. Lawrence White.

directory is provided in which the names in the alphabetical list are rearranged on the geographical basis. The Society, in 1941, had attained a membership of approximately four hundred, and had members in twenty-four countries. A year later a supplementary address list appeared with twenty-five additional names (*Mycologia* 34: 706). Loss in membership is to be expected during the period of the war, but efforts are being made to obtain new members to offset this as far as possible (*Mycologia* 34: 348).

#### CONCERNING MYCOLOGIA

The Society adopted *Mycologia* as its official organ of publication in December, 1932. It had been published throughout the preceding twenty-four years by the New York Botanical Garden, and a twenty-four year index was printed by the Garden, marking the end of the old regime (*Mycologia* 26: 477). At present, in 1943, the journal is in its thirty-fifth volume and its eleventh year under Society auspices. Strengthened by the support of the entire body of American mycologists, and aided by a growing endowment fund (*Mycologia* 26: 191; 27: 551; 29: 267; 30: 110; 31: 235; 32: 574; 34: 348) built up from private sources and from the sale of sets of the early volumes (*Mycologia* 28: 85; 30: 244), it has gradually increased in size and in the number of its illustrations.

*Mycologia* was established by the New York Botanical Garden, in 1909, to meet the need resulting from discontinuance of the *Journal of Mycology*. William Alphonso Murrill<sup>9</sup> served as its editor-in-chief throughout its first sixteen years. When he retired from the Garden staff in 1924, F. J. Seaver succeeded him in the editorship. Before the adoption of *Mycologia* by the Society, the cover<sup>10</sup> of the journal bore the names of a dozen or more American and foreign mycologists who had accepted the invitation of the editor-in-chief to serve with him as associate

<sup>9</sup> The index volume contains a frontispiece portrait of Doctor Murrill and a short historical statement covering the affairs of the journal throughout its first twenty-four years.

<sup>10</sup> A blue cover bearing the seal of the Garden had been used from the beginning. With adoption of the journal by the Society, the present brown cover was substituted, and the date of issue of the numbers was changed (*Mycologia* 25: 65).

editors. By the terms of our contract with the Garden a new editorial board came into existence. It consists of five members elected by the Council of the Society and a managing editor named by the Garden. This board of six editors elects an editor-in-chief annually. Doctor Seaver has now served the Society continuously for eleven years in the dual capacity of managing editor and editor-in-chief.

The membership of the first editorial board under Society auspices was announced by the Council, in December 1932, at Atlantic City, as follows:

- F. J. Seaver—Managing Editor
- H. M. Fitzpatrick—to serve only during 1933
- J. A. Stevenson —to serve during 1933–1934
- F. A. Wolf —to serve during 1933–1935
- G. R. Bisby —to serve during 1933–1936
- E. B. Mains —to serve during 1933–1937

Annually, thereafter, with the expiration of the term of office of a single editor, the Council has named a successor to serve for a five-year period. The following have been named to fill these vacancies.

- G. W. Martin —1934–1938
- J. A. Stevenson—1935–1939 (second term)
- F. A. Wolf —1936–1940 (second term)
- J. N. Couch —1937–1941 (resigned after serving 3 yrs.)
- F. K. Sparrow —1940–1941 (named for Couch's unexpired term)
- S. M. Zeller —1938–1942
- H. S. Jackson —1939–1943
- J. A. Stevenson—1940–1944 (third term)
- J. H. Miller —1941–1945
- J. G. Hopkins —1942–1946
- A. H. Smith —1943–1947

The board for 1943 consists of the last five in the list, and the managing editor.

#### OFFICERS OF THE SOCIETY

When the Society was voted into existence at New Orleans in December, 1931, officers were chosen to serve during 1932. They



were elected by those in attendance at the last business session of the Mycological Section of the Botanical Society of America, and constituted a committee empowered to complete the organization of the new Society. A year later, at the first business

TABLE III  
PAST AND PRESENT OFFICERS OF THE SOCIETY

PRESIDENT		VICE-PRESIDENT	
1932	Wm. H. Weston, Jr.	1933	G. W. Martin
1933	C. L. Shear	1934	B. O. Dodge
1934	H. S. Jackson	1935	John Dearness
1935	B. O. Dodge	1936	A. H. R. Buller
1936	H. M. Fitzpatrick	1937	L. O. Overholts
1937	John Dearness	1938	E. B. Mains
1938	L. O. Overholts	1939	D. H. Linder
1939	H. H. Whetzel	1940	E. A. Bessey
1940	D. H. Linder	1941	W. H. Snell
1941	E. A. Bessey	1942	J. N. Couch
1942	E. B. Mains	1943	F. D. Kern
1943	J. N. Couch		
SECRETARY-TREASURER		COUNCILORS	
1932-35	H. M. Fitzpatrick	1932	N. E. Stevens
1936-38	D. H. Linder	1932-33	H. S. Jackson
1939-41	J. N. Couch	1932-34	C. R. Orton
1942-44	G. B. Cummins <sup>11</sup>	1934-35	L. O. Overholts
		1935-36	C. L. Shear
		1936-37	B. O. Dodge
		1937-38	H. M. Fitzpatrick
		1938-39	Wm. H. Weston, Jr.
		1939-40	L. O. Overholts
		1940-41	H. H. Whetzel
		1941-42	F. D. Kern
		1942-43	D. H. Linder
		1943	F. D. Heald
		1943-44	E. B. Mains
		1943-44	C. W. Dodge
HISTORIAN			
1937-43	H. M. Fitzpatrick		

<sup>11</sup> W. W. Diehl was elected and his name appeared on the cover of the first issue of *Mycologia* for 1942. Being unable to serve, he resigned, and the Council then named G. B. Cummins to fill the vacancy.

session of the Society at Atlantic City, officers nominated by this committee were elected to serve during 1933. Also, a constitution was adopted which provided for nomination and election of officers, thereafter, by mail, and specified that ballots be sent by the Secretary-Treasurer to the entire membership. Beginning with the year 1934, this democratic method has been



followed. In Table III a complete list of the past and present officers of the Society is provided.

The Society names two representatives to serve on the Council of the American Association for the Advancement of Science. Similarly it has one representative on the National Research Council and one on the Editorial Committee of the American Journal of Botany. It also has several standing committees. The names of the representatives now acting and the present membership of these committees are listed in the Directory of the Society (*Mycologia* **33**: 699). Earlier representatives are listed in the Year Books for 1937-1939 and in publications of the other organizations involved. The delegates of the Society at the Sixth International Botanical Congress at Amsterdam in 1935 were D. H. Linder, F. J. Seaver, and C. L. Shear (*Mycologia* **27**: 226; **28**: 92). We were represented on the council of the Third International Congress for Microbiology at New York in 1939 by W. C. Coker.

#### DEATHS

In the following list the attempt has been made to include the names of all deceased members of the Society. We hope that none has been inadvertently omitted. It has seemed appropriate to include also the names of a few who were not members, but whose passing was noted in *Mycologia* nevertheless. Most of these were distinguished mycologists who died shortly before or soon after the formation of the Society. The references provided are to obituaries or similar material.

- Arthur, Joseph Charles, b. 1850, d. 1942 (*Mycol.* **34**: 601; *Phytopath.* **33**: 428).  
 Banker, Howard James, b. 1866, d. 1940, not a member (*Mycol.* **33**: 341).  
 Bartholomew, Elam, b. 1852, d. 1934 (*Mycol.* **27**: 91).  
 Blackford, Mrs. Eliza B., b. 1849, d. 1935 (*Mycol.* **24**: 247; Year Book for 1937).  
 Burnham, Stewart Henry, b. 1870, d. 1943 (*Science* **98**: 318).  
 Burt, Edward Angus, b. 1859, d. 1939 (*Science* **89**: 405; Year Book for 1939).  
 Clinton, George Perkins, b. 1867, d. 1937 (*Mycol.* **30**: 481; *Phytopath.* **28**: 304).  
 Davis, John Jefferson, b. 1852, d. 1937 (*Phytopath.* **28**: 303; also see in volume 5 of the Archives a copy of Allen, Charles E., Birge, Edward A., Gilbert, Edward M. A tribute to Dr. J. J. Davis—with two portraits. Printed for private distribution by his daughter Marguerite Davis).  
 Fairman, Charles Edward, b. 1856, d. 1934 (*Mycol.* **27**: 229, 328).  
 Forwood, Reginald, d. 1937 (Year Book for 1938).  
 Galloway, Beverly Thomas, b. 1863, d. 1938, not a member (*Mycol.* **30**: 597).

- Goldsmith, Harry, b. 1889, d. 1939, teacher of biology and chemistry, and chairman of Science Department, Central High School, Newark, New Jersey (Year Book for 1939).
- Kauffman, Calvin Henry, b. 1869, d. 1931, not a member (Mycol. 23: 407; 24: 265; Phytopath. 22: 271, 489).
- Kellerman, Karl Frederic, b. 1879, d. 1934, not a member (Mycol. 26: 477).
- Kelly, Howard Atwood, b. 1858, d. 1943 (Mycol. 35: 383; Science 97: 176).
- Krieger, Louis Charles Christopher, b. 1873, d. 1940 (Mycol. 33: 241; 35: 383).
- Lewis, Mrs. Esther, d. 1934, joined the Society too late to be listed as a charter member and died before the Year Book for 1934 was issued (Mycol. 27: 328; Year Book for 1935).
- Macbride, Thomas Huston, b. 1848, d. 1934 (Mycol. 26: 379; 27: 328).
- Miles, Lee Ellis, b. 1890, d. 1942 (Phytopath. 32: 352).
- Puttemans, Arsene, d. 1937 (Year Book for 1938).
- Rosett, Joshua, b. 1875, d. 1940 (Mycol. 33: 690).
- Seymour, Arthur Bliss, b. 1859, d. 1933, not a member (Mycol. 26: 279; Phytopath. 24: 576).
- Shimek, Bohumil, b. 1861, d. 1937 (Mycol. 29: 364).
- Stevens, Frank Lincoln, b. 1871, d. 1934 (Mycol. 27: 1, 328; Phytopath. 26: 500).
- Taubenhaus, Jacob Joseph, b. 1884, d. 1937 (Phytopath. 28: 305).
- Thaxter, Roland, b. 1858, d. 1933, not a member (Mycol. 25: 69; Phytopath. 23: 502, 565).
- Thomas, William Sturgis, d. 1940 (Mycol. 24: 247; 35: 133).
- Torrey, Raymond H., d. 1938 (Year Book for 1939).
- Van Hook, James M., b. 1870, d. 1935 (Phytopath. 26: 501).

In assembling the data for the above list it was discovered that, in some instances, adequate obituary matter has not been published. It is not too late to do so, and colleagues of those who have not yet been thus honored are urged to submit material to *Mycologia*. Photographs, genealogical data, biographical matter, and a list of publications might well be filed with the Historian for permanent deposit in the Archives, in the case of every deceased member.

#### FUTURE RECORDS

The writer wishes to tender the thanks of the Society to those who have contributed materials for deposit in the Archives. Members should assume at all times the obligation of submitting historically interesting items without awaiting solicitation. Only with general coöperation can the Historian function effectively.

In conclusion, several suggestions are offered for consideration. As the Historian is not a member of the Council he does not have direct access to information concerning the actions taken by that

body. He is dependent on occasional notices printed in *Mycologia* or mailed to the members by the Secretary-Treasurer. Annual deposit in the Archives of a resumé of Council Proceedings, inclusive of all matters worthy of permanent recording, would seem to be desirable. Also some record should be made of the content of papers presented at the winter meetings. As publication of the abstracts is regarded as undesirable, the suggestion is made that they be deposited annually with the Historian by the Secretary-Treasurer. In a decade they would constitute a volume containing data not elsewhere available, and wholly worthy of a place in the series constituting the Archives.

CORNELL UNIVERSITY,  
ITHACA, NEW YORK

## GRAMINICOLOUS SPECIES OF PHYLLACHORA IN NORTH AMERICA<sup>1</sup>

C. R. ORTON

The studies upon which this work is based were initiated in 1916 at the New York Botanical Garden under the direction of Dr. F. J. Seaver when the writer was on leave from the Pennsylvania State College and while engaged in graduate work at Columbia University. More specifically it was an outgrowth of cytological studies on *Phyllachora graminis* under the direction of Professor R. A. Harper. The work was continued at the Pennsylvania State College until 1925 when the writer moved to New York to engage in research for the Bayer Company, Inc., and resumed at West Virginia University in 1929. At no time during these intermittent periods have these studies been pursued as a major task but wholly in an incidental manner outside official working hours. This comment is made to explain in part the long period which has been required to complete them to this point.

At first it was planned to monograph the genus *Phyllachora* but this idea was abandoned when it became evident that the species upon grasses were so numerous, and presented so many difficult problems that it seemed best to restrict this study to the grass-inhabiting forms in North America as delimited geographically in the "North American Flora."

Over all these years a large number of specimens has been studied. The collections at the New York Botanical Garden and the United States Department of Agriculture have been examined in considerable detail. In addition, herbaria of Harvard University, Pennsylvania State College, Cornell University, Michigan State College, Iowa State College, Universities of California, Wisconsin, Georgia, Nebraska, Illinois, Purdue, Louisiana State and Oregon State College have all contributed generously. No less notable has been the assistance rendered by those collectors who have faithfully sent collections, thus greatly enlarging the

<sup>1</sup>Scientific Paper No. 313 of the West Virginia Agricultural Experiment Station.

geographical distribution of numerous species and host ranges. In several instances such contributions have turned up species hitherto undescribed. The list of contributors includes H. H. Whetzel, C. E. Chardon, E. E. Bethel, J. J. Davis, Percy Wilson, John A. Stevenson, Roderick Sprague, Julian H. Miller, H. C. Greene, B. H. Davis, Lee Bonar, W. W. Ray, W. C. Cooke, C. L. Lefebvre, Dr. Carlos Garces O., Bogota, Colombia, and also Dr. Juan C. Lindquist, La Plata, Argentina, to whom the writer is especially indebted for furnishing types of Spegazzinian species. To all of these and many others who have aided in this work the writer wishes to express his heartiest thanks. The writer wishes particularly to acknowledge great obligation to Mrs. Agnes Chase who has never failed to give of her time and talents to the identification of host plants which in a majority of cases have been fragmentary and therefore most difficult to determine. The writer is further indebted to Berch Henry, a former graduate assistant, for aid and interest in the comparative studies.

The task of monographing a group of organisms if discriminatory is always difficult. In the present instance it has been difficult because of the absence of mature asci and ascospores in many of the collections, factors upon which chief reliance must be based. The other characters, particularly the clypeus, have been helpful but not wholly determinative. Furthermore the highly parasitic nature of the species on grasses and of the genus as a whole has made it impossible thus far to cultivate any one of them upon artificial media. In fact no authentic and controlled cultures upon host plants have been made and until the techniques of cultures are worked out no final estimate of specific limitations can be reached.

Another puzzling factor is the frequent association of pycnidiospores produced in apparently similar and closely associated fructifications. At present there is no proof that any of these asexual stages is phylogenetically connected with any *Phyllachora*, yet the circumstantial evidence points to such an association and the writer has included them in the specific descriptions where it seemed justified by association and other reasons. Such relationships must await cultural studies for final conclusion.

More conclusive is the presence in most, if not all species of bacilloid or allantoid bodies of small size; these are borne in pycnidia-like structures probably of a spermagonial nature, although their origin and functions have not been demonstrated. Finally the development of an adequate key to the species has been particularly difficult. The present effort is only a beginning.

In conclusion it seems necessary to discuss briefly the taxonomic status of *Phyllachora* in relationship with the known morphologic characters. The genus was established by Fuckel in 1869 and based upon *Sphaeria graminis* Pers. He placed it in the family Dothideaceae which was erected by him to include those forms with the ascocarp embedded in a stroma and lacking true perithecial walls. Without entering into the involved problem of the standing of the family Dothideaceae it may suffice to state that the writer's studies (1924), together with those of Petrak (1924) and Miller (1941) appear to justify amply the removal of the graminicolous phyllachoras from the Dothideaceae.

They should be placed in some family of the Sphaeriales characterized by a compound fructification in which an extension of the perithecial walls results in the formation of a plaque or clypeus overlying or underlying, or both, the usually numerous ascocarps which are typically embedded in the mesophyll leaf tissues and are formed successively in a peripheral manner. The compact pseudoparenchymatous walls are not true stromata but only resemble stromatic tissues and should not be confused with such forms as exist in *Catacauma flabella* for instance. Further ontogenetical studies must be made before certain other species included in the genus can be definitely and accurately placed in our classification of the fungi.

PHYLLACHORA Nitsch. in Fuckel, Symb. Myc. 216. 1869

*Diachora* J. Muell. Bot. Centralb. 57: 346. 1894.

*Pseudomelasmia* Henn. Hedwigia 41: 115. 1902.

*Metachora* Syd. & Butler, Ann. Myc. 9: 400. 1911.

*Endophyllachora* Rehm, Philipp. Jour. Sci. 7: 397. 1913.

Fructification parasitic, foliicolous, simple or usually compound on maturity, made up of few to numerous ascocarps generally crowded together in the mesophyll so that their lateral walls form

a dark-brown palisade-like tissue when viewed in cross section; the apical and basal regions of the ascocarps usually extended radially or in the direction of the leaf axis to form a blackish clypeus more or less conspicuous in the epidermal region of one or both leaf surfaces; ascocarps opening by an ostiole through the overarching clypeus; paraphyses filiform; asci cylindrical to broadly ellipsoid, operculum not usually conspicuous; ascospores 1-celled, hyaline, variously arranged. Conidia of uncertain phylogeny and borne in similar fructifications are rather constantly present in some species, variously shaped; spermatia (?) short-filiform, rather commonly present

Type species: *Phyllachora graminis* on *Elymus europeus*.

#### KEY TO SPECIES

1. Ascospores arranged uniseriately in the ascus.  
(ascospores arranged biseriately, see p. 23).
2. Ascospores spherical or sub-spherical.
  3. Ascospores averaging 7.5 by 10  $\mu$ . 11. *P. sphaerosperma*.
  3. Ascospores averaging 8 by 12  $\mu$ . 28. *P. Ammophilae*.
  3. Ascospores averaging 10.5 by 16  $\mu$ . 37. *P. Spartinae*.
2. Ascospores ovoid.
  3. Ascospores broadly ovoid, average ratio width to length less than 1-2  $\mu$ . 37. *P. Spartinae*.
  3. Ascospores narrowly ovoid, average ratio width to length 1-2 or greater.
    4. Asci elliptical, 12-20  $\mu$  wide. 4. *P. quadraspora*.
    4. Asci cylindrical.
      5. Asci 8-10  $\mu$  wide. 40. *P. Eragrostidis*.
      5. Asci 10-15  $\mu$  wide. 13. *P. Eriochloae*.
2. Ascospores ellipsoid.
  3. Ascospores broadly ellipsoid, ratio width to length less than 1-2  $\mu$ .
    4. Ascospores small, 7.5-11  $\mu$  long.
      5. Clypei oval to elliptical in outline. 34. *P. Boutelouae*.
      5. Clypei elliptical to fusiform in outline. 27. *P. Phalaridis*.
      5. Clypei irregular in outline. 25. *P. insularis*.
    4. Ascospores of medium size, 9-13  $\mu$  long.
      5. Asci narrowly cylindrical, 8-12  $\mu$  wide.
      6. Asci 60-80  $\mu$  in length.
      7. Clypei circular to oval in outline.
        8. Clypei 0.5-1.0 by 0.5-1.5 mm. 23. *P. parilis*.
        8. Clypei 0.1-0.3 by 0.2-0.8 mm. 24. *P. paspalicola*.

7. Clypei oval to fusiform in outline. 17. *P. Wilsonii*.
6. Asci longer, 70–100  $\mu$  long.
  7. Clypei circular in outline, large. 1. *P. Maydis*.
  7. Clypei oval in outline, small. 6. *P. brevifolia*.
  7. Clypei elliptical to linear. 42. *P. graminis*.
6. Asci 80–115  $\mu$  long.
  7. Clypei elliptical to linear, large. 5. *P. luteo-maculata*.
5. Asci broader, 10–15  $\mu$  wide.
  6. Clypei mostly circular in outline. 9. *P. Anthephorae*.
  6. Clypei oval to elliptical in outline scattered. 12. *P. macorisensis*.
  6. Clypei elliptical to linear in outline, gregarious and frequently confluent. 36. *P. serialis*.
4. Ascospores larger, mostly 12–17  $\mu$  long.
  5. Asci 10–15  $\mu$  wide. 28. *P. Ammophilae*.
  5. Asci 15–20  $\mu$  wide.
    6. Clypei amphigenous, small, less than 1 mm. long. 10. *P. Arundinellae*.
    6. Clypei chiefly epiphyllous, larger. 3. *P. nervisequia*.
3. Ascospores narrowly ellipsoid, average ratio width to length 1–2 or greater.
  4. Ascospores small, 7.5–10  $\mu$  long. 18. *P. guianensis*.
  4. Ascospores medium sized, 9–13  $\mu$  long.
    5. Clypei circular to broadly oval in outline. 24. *P. paspalicola*.
    5. Clypei oval to elliptical in outline.
      6. Clypei not more than 0.5 mm. wide.
        7. On Paniceae. 15. *P. punctum*.
        7. On Festuceae. 40. *P. Eragrostidis*.
      6. Clypei up to 1.0 mm. wide. 30. *P. vulgata*.
  5. Clypei oval to fusiform in outline, up to 2.0 mm. long. 17. *P. Wilsonii*.
  5. Clypei elliptical to linear in outline.
    6. Clypei large, up to 5 mm. long. 42. *P. graminis*.
    6. Clypei small, not more than 1 mm. long. 36. *P. serialis*.
4. Ascospores large, mostly 12–20  $\mu$  long.
  5. Clypei circular to oval in outline. 41. *P. silvatica*.



5. Clypei oval to elliptical in outline.
  6. Ascospores 10-15  $\mu$  long. 13. *P. Eriochloae*.
  6. Ascospores 13-18  $\mu$  long. 7. *P. Erianthi*.
5. Clypei long-elliptical to linear in outline.
  6. Clypei amphigenous.
    7. Ascospores 13-16  $\mu$  long. 31. *P. texensis*.
    7. Ascospores 15-20  $\mu$  long. 32. *P. coloradensis*.
  6. Clypei chiefly epiphyllous.
    7. Ascospores 11-14  $\mu$  long. 33. *P. Oryzopsidis*.
    7. Ascospores 17-22  $\mu$  long. 46. *P. tetraspora*.
2. Ascospores ovate-acuminate.
  3. Ascospores narrow, 5-6  $\mu$  wide. 35. *P. Leptochloae*.
  3. Ascospores broader, 6-8  $\mu$  wide.
    4. Ascospores 11-16  $\mu$  long (8-spored form). 4. *P. quadraspora*.
    4. Ascospores 15-23  $\mu$  long.
      5. On Paniceae.
        6. Asci 4-spored. 19. *P. tetrasporicola*.
        6. Asci 8-spored. 20. *P. cornispora*.
      5. On Agrostideae. 29. *P. Epicampedis*.
    3. Ascospores large, 7.5-9.5 by 20-26  $\mu$  (4-spored form). 4. *P. quadraspora*.
  2. Ascospores fusiform.
    3. Ascospores narrow, 4.5-6  $\mu$  wide.
      4. Ascospores 10-14  $\mu$  long. 38. *P. Pammelii*.
      4. Ascospores 14-19  $\mu$  long. 35. *P. Leptochloae*.
    3. Ascospores broader, 5.5-8.5  $\mu$  wide.
      4. Ascospores 15-22  $\mu$  long.
        5. Asci cylindrical, 8-10  $\mu$  wide. 19. *P. tetrasporicola*.
        5. Asci cylindrical to ellipsoid, 10-18  $\mu$  wide. 20. *P. cornispora*.
      4. Ascospores 12-16  $\mu$  long. 41. *P. silvatica*.
  1. Ascospores arranged biserially or inordinately.
    2. Ascospores ovoid.
      3. Ascospores narrow, 4-5  $\mu$  wide. 14. *P. Lasiacis*.
      3. Ascospores broader, 6-9.5  $\mu$  wide.
        4. Ascospores 11-16  $\mu$  long (8-spored form). 4. *P. quadraspora*.
        4. Ascospores 17-26  $\mu$  long.
          5. Asci 15-20  $\mu$  wide.
            6. Ascospores 17-23  $\mu$  long. 8. *P. oxyspora*.
            6. Ascospores 20-26  $\mu$  long (4-spored form). 4. *P. quadraspora*.
          5. Asci 20-25  $\mu$  wide. 45. *P. portoricensis*.
    2. Ascospores ellipsoid.
      3. Ascospores broadly ellipsoid, ratio width to length less than 1-2.
      4. Ascospores 6.5-8 by 12-15  $\mu$ . 16. *P. Chardonii*.

3. Ascospores narrowly ellipsoid, ratio width to length 1-2 or greater.
  4. Clypei mostly hypophyllous.
    5. Ascospores 4.5 to 5.5  $\mu$  wide. 39. *P. diplocarpa*.
    5. Ascospores 6.0-7.5  $\mu$  wide. 41. *P. silvatica*.
  4. Clypei amphigenous.
    5. Clypei not greater than 0.5 by 1.0 mm.
    6. Clypei brown. 2. *P. tripsacina*.
    6. Clypei black.
      7. Asci cylindrical-clavate, 55-75  $\mu$  long. 26. *P. Leersiae*.
      7. Asci cylindrical, 75-100  $\mu$  long. 43. *P. Arundinariae*.
    5. Clypei up to 1.0 by 2.0 mm. 21. *P. heterospora*.
  2. Ascospores ovate-acuminate.
    3. Asci mostly 9-15  $\mu$  in width (sometimes wider *P. cornispora*).
    4. Clypei oval to elliptical in outline.
      5. Clypei small, up to 0.5 mm. wide by 1.5 mm. long. 20. *P. cornispora*.
      5. Clypei larger, up to 1.0 mm. wide by 3.0 mm. long. 35. *P. Leptochloae*.
    4. Clypei elliptical to linear in outline.
      5. Ascospores medium sized, 4-5 by 9.5-13  $\mu$ . 14. *P. Lasiacis*.
      5. Ascospores large, 6-8 by 19-23  $\mu$ . 25. *P. Epicampedis*.
    3. Asci 15-25  $\mu$  wide.
      4. Ascospores large, 7-9 by 12-23  $\mu$ . 8. *P. oxyspora*.
      4. Ascospores very large, 9-10 by 30-38  $\mu$ . 44. *P. excelsior*.
  2. Ascospores fusiform.
    3. Ascospores narrow, 4.5-6  $\mu$  wide.
      4. Asci short, 40-70  $\mu$  long. 22. *P. congruens*.
      4. Asci of medium length, 70-95  $\mu$ .
        5. Ascospores 10-14  $\mu$  long. 38. *P. Pammelii*.
        5. Ascospores 15-19  $\mu$  long. 35. *P. Leptochloae*.
    3. Ascospores of medium width, 6.0-8.5  $\mu$ .
      4. Clypei 0.1-0.4 by 0.1-0.8 mm. 43. *P. Arundinariae*.
      4. Clypei 0.4-0.8 by 0.5-1.0 mm. 41. *P. silvatica*.
      3. Ascospores very large, 9-10 by 30-38  $\mu$ . 44. *P. excelsior*.
1. PHYLLACHORA MAYDIS Maubl. Bull. Soc. Myc. France 20: 72. 1904.

Clypei amphigenous, generally circular in outline, 0.5-2 mm. across, sometimes confluent to form continuous stripes up to 10 mm., black; fructification compound, ascocarps nearly spherical, immersed in the mesophyll; asci cylindrical, 8-10 by 80-100  $\mu$ , with a short pedicel; 8 ascospores broadly ellipsoid, 5.5-7 by 9-12  $\mu$ , uniseriate.

On Poaceae:

*Zea Mays* L. Dominican Republic; Guatemala; Mexico;  
Puerto Rico.

TYPE LOCALITY: Mexico on *Zea Mays*.

DISTRIBUTION: Mexico, the West Indies and Northern South America.

2. *PHYLLACHORA TRIPSACINA* Pet. & Cif. Ann. Myc. **30**: 253.  
1932.

Clypei amphigenous but more prominent on upper surface, oval to elliptical in outline, 0.1–0.5 mm. wide by 0.2–1.0 mm. long, rarely confluent, blackish brown; fructification compound, ascocarps nearly spherical, immersed in the mesophyll; asci long elliptical, 15–20 by 90–110  $\mu$ , with a long tapered pedicel; 8 ascospores, ellipsoid to fusoid, 6.5–7.5 by 16–19  $\mu$ , biseriate or inordinate.

On Poaceae:

*Tripsacum dactyloides* (L.) L. Dominican Republic.

TYPE LOCALITY: Sabana de Guerra, Dominican Republic.

DISTRIBUTION: Known only from Dominican Republic.

3. *Phyllachora nervisequia* (Schw.) comb. nov.

*Sphaeria nervisequia* Schw. Trans. Am. Phil. Soc. II. **4**: 208.  
1832.

*Sphaeria Andropogi* Schw. Trans. Am. Phil. Soc. II. **4**: 209.  
1832.

*Phyllachora Andropogi* Ellis & Ev. N. Am. Fungi 2828.  
1893.

Clypei chiefly epiphyllous, scattered, oval to elliptical, black, 0.3–0.5 mm. wide by 0.5–1.3 mm. long, rarely 1 mm. wide and confluent to form stripes up to 4.5 mm. long; fructification compound; asci cylindrical to narrowly ellipsoid, 15–19 by 95–125  $\mu$ ; 8 ascospores, broadly ellipsoid, 7–8.5 by 12–17  $\mu$ , usually uniseriate.

On Poaceae:

*Andropogon bicornis* L. Puerto Rico.

*Andropogon Elliotii* Chapm. South Carolina.

*Andropogon glomeratus* (Walt.) B.S.P. Florida, Georgia,  
Texas; Dominican Republic; Puerto Rico.

*Andropogon longiberbis* Hack. Alabama, Florida.

*Andropogon ternarius* Michx. Alabama, Georgia.

*Andropogon* sp. Louisiana, Mississippi, Pennsylvania, Virginia.

TYPE LOCALITY: Bethlehem, Pennsylvania, on *Andropogon* sp.

DISTRIBUTION: Pennsylvania to Florida and the West Indies.

4. PHYLLACHORA QUADRASPORA Tehon, Bot. Gaz. 67: 507. 1919.

Clypei amphigenous but more conspicuous on lower surface, scattered or gregarious in areas up to 2 cm. in length, elliptical in outline, 0.1–0.3 wide by 0.3–1.0 mm. long; fructification simple or compound; asci narrowly ellipsoid to cylindrical, 15–20 by 75–110  $\mu$ ; 8-ascospore form with uniseriate, biseriate or inordinate arrangement, ascospores narrowly ovoid, 6–8 by 11.5–16; 4-ascospore form with uniseriate or biseriate arrangement, ascospores narrowly ovoid to ovate acuminate, 7.5–9.5 by 20–26; conidia lunate, 1-septate, 2.5–3.0 by 23–40  $\mu$ .

On Poaceae:

*Andropogon bicornis* L. Puerto Rico.

*Andropogon fastigiatus* Sw. (*Diectomis fastigiatus* H.B.K.). Mexico.

*Andropogon leucostachyus* H.B.K. Dominican Republic; Panama; Puerto Rico.

*Andropogon semiberbis* (Nees) Kunth. Dominican Republic; Puerto Rico.

*Andropogon* sp. Florida.

*Rotboellia rugosa* Nutt. Mississippi.

TYPE LOCALITY: Maricao, Puerto Rico on "*Paspalum glabrum*" error for *Andropogon semiberbis*.

DISTRIBUTION: Mississippi to Panama, the West Indies and South America.

5. PHYLLACHORA LUTEO-MACULATA (Schw.) Orton, Jour. Dept. Agr. Puerto Rico 2: 152. 1918.

*Sphaeria andropogonicola* Schw. Trans. Am. Phil. Soc. II. 4: 209. 1832.

*Sphaeria luteo-maculata* Schw. Trans. Am. Phil. Soc. II. 4: 209. 1832.

Clypei amphigenous but more conspicuous on upper leaf surface, elliptical to linear, scattered, but sometimes confluent, 0.2–1.2 mm. wide by 0.5–6.0 mm. long, black; fructification com-

pound; asci cylindrical, 9–12 by 75–115  $\mu$ ; 8 ascospores, broadly ellipsoid, 5–7.5 by 9–12  $\mu$ , uniseriate; conidia in similar fructifications, 3-septate, cylindrical, 3–3.5 by 18–20  $\mu$ .

On Poaceae:

*Andropogon furcatus* Muhl. (*A. provincialis* var. *furcatus* Hack.). Illinois, Massachusetts, Michigan, Nebraska, New York, South Dakota, Wisconsin.

*Andropogon Hallii* Hack. New Mexico.

*Andropogon perforatus* Trin. Texas.

*Andropogon saccharoides* Swartz. Texas.

*Andropogon Virginicus* L. Alabama, Louisiana, New Jersey, North Carolina, Virginia.

*Andropogon* sp. South Carolina.

*Schizachyrium scoparium* (Michx.) Nash (*Andropogon scoparius* Michx.). Georgia, Massachusetts, Minnesota, Pennsylvania, Virginia.

*Sorghastrum nutans* (L.) Nash. Iowa.

TYPE LOCALITY: South Carolina on *Andropogon* sp.

DISTRIBUTION: Massachusetts to Nebraska and southward to South Carolina and New Mexico.

EXSICCATI: Ellis & Ev. N. Am. Fungi 2828; Griff. W. Am. Fungi 39. Cooke, Mycob. N. Am. 91.

6. *PHYLLACHORA BREVIFOLIA* Chardon, Jour. Dept. Agr. Puerto Rico 13: 11. 1929.

Clypei amphigenous, oval to broadly elliptical in outline, scattered, rarely confluent, 0.2–0.4 mm. wide by 0.3–1.0 mm. long, black; fructification simple or compound with few ascocarps; asci cylindrical, 8–12 by 65–100  $\mu$ ; 8 ascospores, broadly ellipsoid, 5.5–7 by 10.5–13  $\mu$ , uniseriate.

On Poaceae:

*Andropogon brevifolius* L. Puerto Rico.

TYPE LOCALITY: Rio Piedras, Puerto Rico on *Andropogon brevifolius* L.

DISTRIBUTION: The West Indies and South America.

7. *Phyllachora Erianthi* sp. nov.

Clypei amphigenous, scattered or sometimes gregarious in large patches, chiefly oval in outline, rarely confluent, 0.1–0.6 mm.

wide by 0.2–1.0 mm. long, black; fructification simple or compound with few ascocarps; asci cylindrical, 9–15 by 75–115  $\mu$ ; 8 ascospores, narrowly ellipsoid, 6–8 by 13–18  $\mu$ , uniseriate; conidia borne in similar fructifications, cylindrical, 3-septate, 4 by 23  $\mu$ . Spermatia (?) thread-like, 0.5 by 15–20  $\mu$ , often curved.

On Poaceae:

*Erianthus alopecuroides* (L.) Ell. (*E. divaricatus* Hitchc.).

South Carolina.

*Erianthus brevibarbis* Michx. Florida, Georgia.

*Erianthus contortus* Ell. Georgia.

*Erianthus giganteus* (Walt.) Muhl. Alabama, Florida.

TYPE LOCALITY: Alabama on *Erianthus* sp.

DISTRIBUTION: South Carolina to Alabama.

EXSICCATI: Ravenel, Fungi Am. 388.

8. PHYLLACHORA OXYSPORA Starb. Bih. Sv. Vet.-Akad. Handl.  
25: 45. 1900.

*Phyllachora Cyperi* var. *obtusata* Starb. Bih. Sv. Vet.-Akad.  
Handl. 25: 1899.

*Phyllachora Imperatae* Syd. Ann. Myc. 15: 226. 1917.

*Phyllachora antioquiensis* Chardon, Bul. Real Soc. Esp. Hist.  
Nat. 28: 118. 1928.

*Phyllachora Sorghastri* Chardon, Jour. Dept. Agr. Puerto Rico  
16: 177. 1932.

Clypei amphigenous, scattered or gregarious, oval to fusoid in outline, 0.2–1.0 mm. wide by 0.3–2.0 mm. long, sometimes confluent to form larger patches, black; fructification mostly compound with few ascocarps; asci ellipsoid, 15–20 by 90–120  $\mu$ ; 8 ascospores, narrowly ovoid to ovate-acuminate, 7–9 by 17–23  $\mu$ , generally biserial; conidia in similar fructifications cylindrical, 1-septate, 2.5–3.5 by 20–27  $\mu$ .

On Poaceae:

*Imperata brasiliensis* Trin. Dominican Republic.

*Imperata contracta* (H.B.K.) Hitchc. Puerto Rico.

*Sorghastrum parviflorum* (Desv.) H. & Ch. Dominican Republic.

TYPE LOCALITY: San Paolo, Brazil, on unknown grass [*Imperata brasiliensis*].

DISTRIBUTION: West Indies, South America and the Philippines.

9. *PHYLLACHORA ANTHEPHORAE* Sydow, Ann. Myc. 13: 39. 1915.

Clypei amphigenous, more conspicuous on upper surface, scattered, circular or broadly oval in outline, prominently convex on both surfaces, 0.1–0.25 mm. wide by 0.1–0.4 mm. long, black; fructification simple or compound with few ascocarps; asci cylindrical, 10–14 by 70–100  $\mu$ ; 8 ascospores broadly ellipsoid, 5.5–7.5 by 10–13.5  $\mu$ , uniseriate.

On Poaceae:

*Antheophora hermaphrodita* (L.) Kuntz. Dominican Republic; Jamaica; Puerto Rico.

TYPE LOCALITY: Kingston, Jamaica on *Antheophora hermaphrodita*.

DISTRIBUTION: West Indies and South America.

10. *Phyllachora Arundinellae* sp. nov.

Clypei amphigenous, generally gregarious, more rarely scattered, oval to elliptical in outline, 0.1–0.3 mm. wide by 0.3–0.8 mm. long, black; fructification chiefly simple; asci cylindrical to narrowly ellipsoid, 17–20 by 95–115  $\mu$ ; 8 ascospores, broadly ellipsoid, 7–8 by 13–15.5  $\mu$ ; uniseriate; conidia associated in similar fructifications, fusoid, 2-celled, 2–2.5 by 10.5–17  $\mu$ .

On Poaceae:

*Arundinella confinis* (Schult.) Hitchc. & Chase (*A. martinicensis* Trin.). Puerto Rico.

TYPE LOCALITY: Maricao, Puerto Rico on *Arundinella confinis*.

DISTRIBUTION: Known only from Puerto Rico.

11. *PHYLLACHORA SPHAEROSPERMA* Winter, Hedwigia 23: 170. 1884.

*Phyllachora sphaerospora* Pat. Bull. Soc. Myc. France 3: 126. 1887 (in part).

*Phyllachora cenchricola* Speg. Anal. Mus. Nac. Buenos Aires 12: 245. 1909.

*Sphaerodothis sphaerosperma* (Winter) Stev. & Moore. Ill. Biol. Monog. 11: 43. 1927.

Clypei amphigenous, broadly oval, rarely elliptical in outline, often thickly scattered over considerable areas of the leaf, 0.15–0.4 mm. wide by 0.2–0.8 mm. long, black; fructification generally compound; asci cylindrical, 10–13 by 65–100  $\mu$ ; 8 ascospores, nearly spherical, 7–8.5 by 8–11  $\mu$ , uniseriate; conidia associated in similar fructifications, fusoid to lunar, 1 to 3-septate, 3–4 by 24–34  $\mu$ .

On Poaceae:

*Cenchrus echinatus* L. California; Bahama Islands (Berry Island); Cuba; Puerto Rico.

*Cenchrus incertus* M. A. Curtis. Mississippi.

*Cenchrus myosuroides* H.B.K. Mona Island.

*Cenchrus viridis* Spreng. Canal Zone; Cuba; Jamaica; Puerto Rico.

TYPE LOCALITY: São Francisco, Brazil, on *Cenchrus echinatus*.

DISTRIBUTION: Southern United States, West Indies and in South America.

12. *PHYLLACHORA MACORISENSIS* Chardon, Jour. Dept. Agr. Puerto Rico **13: 14.** 1929.

Clypei amphigenous, oval to elliptical in outline, generally scattered, 0.3–0.5 mm. wide by 0.5–1.2 mm. long, black, not shiny; fructification generally compound; asci cylindrical-clavate, 8–12 by 75–90; 8 ascospores, ellipsoid, 5–6.5 by 10–15  $\mu$ ; uniseriate.

On Poaceae:

*Stenotaphrum secundatum* (Walt.) Kuntze.

TYPE LOCALITY: San Pedro de Macoris, Dominican Republic on *Stenotaphrum* [*secundatum*].

DISTRIBUTION: Known only from type locality.

13. *PHYLLACHORA ERIOCHLOAE* Speg. Anal. Soc. Ci. Argent. **19: 96.** 1885.

*Phyllachora Eriochloae* var. *columbiensis* Thiess. & Syd. Ann. Myc. **13: 448.** 1913.

Clypei amphigenous, oval to elliptical in outline, scattered, sometimes confluent, 0.2–0.3 mm. wide by 0.2–1.0 mm. long, shiny black; fructification simple or compound with few ascarps; asci cylindrical, 10–15 by 75–115  $\mu$ ; 8 ascospores, narrowly ovoid to ellipsoid, 5–7 by 10–15  $\mu$ , uniseriate; spermatia (?) sinuate, 0.5–1.0 by 11–15  $\mu$ , continuous.



## On Poaceae:

*Eriochloa punctata* (L.) Desv. Puerto Rico.

*Eriochloa subglabra* (Nash) Hitchc. Puerto Rico.

TYPE LOCALITY: Santiago, Argentina, on *Eriochloa annulata*.

DISTRIBUTION: West Indies and South America.

## 14. PHYLLACHORA LASIACIS Syd. Ann. Myc. 23: 374. 1925.

Clypei amphigenous, gregarious, interveined, elliptical to linear in outline, 0.1–0.2 mm. wide by 0.1–1.2 mm. long, sometimes laterally confluent; fructification simple or compound with numerous ascocarps; asci long, ellipsoid, 9–12 by 55–75  $\mu$ ; 8 ascospores, narrowly ovoid, or ovate-acuminate, 4–5 by 9.5–13  $\mu$ , biseriate; conidia (?) present in similar fructifications, ellipsoid, 1–1.5 by 3.5  $\mu$ , hyaline, continuous.

## On Poaceae:

*Lasiacis divaricata* (L.) Hitchc. Costa Rica.

*Lasiacis Swartziana* Hitchc. Puerto Rico.

TYPE LOCALITY: San José, Costa Rica, on *Lasiacis divaricata*.

DISTRIBUTION: West Indies and South America.

## 15. PHYLLACHORA PUNCTUM (Schw.) Orton, Stevenson, Jour. Dept. Agr. Puerto Rico 2: 153. 1918.

*Sphaeria punctum* Schw. Trans. Am. Phil. Soc. II. 4: 209. 1832.

*Sphaeria Panici* Schw. Trans. Am. Phil. Soc. II. 4: 209. 1832.

*Phyllachora Panici* Sacc. Syll. Fung. 2: 624. 1883.

*Phyllachora graminis* var. *Tupi* Speg. Anal. Soc. Ci. Argent. 19: 241. 1885.

*Phyllachora graminis Panici* Shear, Ellis & Ev. Fungi Columb. 1752. 1903.

*Phyllachora Oplismeni* Syd. Ann. Myc. 5: 339. 1907.

*Phyllachora Standleyi* Chardon, Jour. Dept. Agr. Puerto Rico 16: 174. 1932.

*Phyllachora Panici-olivacei* Chardon, Bol. Soc. Venez. Cien. Nat. 40: 21 (?). 1939.

Clypei amphigenous, scattered, oval to elliptical, often arranged in linear series, sometimes coalescing to form lines several millimeters long, 0.1–0.4 mm. wide by 0.15–1.5 mm. long, more rarely gregarious, black, shining; fructification simple or more

generally compound containing several ascocarps; asci cylindrical, 8–10 by 75–90  $\mu$ ; 8 ascospores, ellipsoid, 4–5.5 by 9–13  $\mu$ , generally with a prominent guttule, uniseriate; conidia in similar fructification, fusiform, often curved, 1–3 septate, 2–4 by 12–20  $\mu$ ; spermatia (?) small, 0.5 by 7.5–9.5  $\mu$ , often curved.

On Poaceae:

*Leptoloma cognatum* (Schult.) Chase. Texas, Wisconsin.

*Oplismenus Burmanni* (Retz.) Beauv. Costa Rica.

*Oplismenus hirtellus* (L.) Beauv. South Carolina; Cuba; Dominican Republic; Haiti; Puerto Rico.

*Oplismenus Humboldtianus*. Costa Rica.

*Oplismenus setarius* (Lam.) R. & S. Florida, Louisiana; Jamaica; Puerto Rico; St. Croix; Dominican Republic.

*Panicum boreale* Nash. New Hampshire.

*Panicum Boscii* Poir. Florida, Georgia, Illinois, Kentucky, Michigan, Missouri, New York, Wisconsin.

*Panicum clandestinum* L. Delaware, District of Columbia, Georgia, Indiana, Iowa, Maryland, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, West Virginia.

*Panicum commutatum* Schult. Georgia, Mississippi.

*Panicum consanguinem* Kunth. Georgia.

*Panicum depauperatum* Muhl. Virginia.

*Panicum dichotomum* L. Illinois, Michigan, New York, Texas.

*Panicum flavovirens* Nash. Florida.

*Panicum Helleri* Nash. Texas.

*Panicum Huachucae* Ashe. Arkansas, Delaware, Virginia, Wisconsin.

*Panicum implicatum* Scribn. Ontario.

*Panicum Joorii* Vasey. Florida, Louisiana.

*Panicum lancearium* Trin. Florida.

*Panicum lanuginosum* Ell. Arkansas, Delaware, Louisiana, Virginia.

*Panicum latifolium* L. Delaware, Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, New York, Ohio, West Virginia, Wisconsin.

*Panicum Lindheimeri* Nash. Indiana, Louisiana, Wisconsin.

*Panicum linearifolium* Scribn. Texas; Ontario.

*Panicum microcarpon* Muhl. Alabama, Georgia, North Carolina, Virginia.

*Panicum pacificum* Hitchc. & Chase. California.

*Panicum pedicellatum* Vosey. Texas.

*Panicum scabriusculum* Ell. Alabama, Georgia.

*Panicum scoparium* Lam. Alabama.

*Panicum Scribnerianum* Nash. Alabama, Nebraska, Wisconsin.

*Panicum sphaerocarpon* Ell. Pennsylvania, Virginia, West Virginia; Honduras; Puerto Rico.

*Panicum tennesseense* Ashe. Iowa, Wisconsin; Ontario.

*Panicum Wrightianum* Scribn. New York.

*Panicum xalapense* H.B.K. Georgia, Mississippi; Guatemala.

TYPE LOCALITY: Bethlehem, Pennsylvania, on *Panicum nitidum*, probably error for *P. clandestinum*.

DISTRIBUTION: New England to Ontario, south to Texas and Florida, the West Indies and South America.

EXSICCATI: Kellerm. Ohio Fungi 51; Ellis & Ev. Fungi Columb. 1752; Rehm, Ascomycetes 1973; Barth. Fungi Columb. 3645; Ellis, N. Am. Fungi 484; Sydow, Fungi Exot. 516; Cooke, Mycob. N. Am. 90.

16. *Phyllachora Chardonii* Orton; Seaver & Chardon, Sci. Sur. Puerto Rico & Virgin Is. 3: 51. 1926.

Clypei chiefly epiphyllous, scattered, circular to oval in outline, 0.2–0.3 mm. wide by 0.3–0.5 mm. long, black; fructification simple or compound, perithecia-flattened globose; asci ellipsoid, 12–22 by 65–110  $\mu$ ; 8 ascospores, broadly ellipsoid, 6.5–8 by 12–15, usually biseriata or inordinate.

On Poaceae:

*Panicum geminatum* Forsk. Florida; Puerto Rico.

TYPE LOCALITY: Puerto Rico on *Panicum geminatum*.

DISTRIBUTION: Southern United States, West Indies and the Philippines.

17. *Phyllachora Wiisoni* sp. nov.

Clypei amphigenous, scattered, oval to fusiform in outline, 0.2–1.0 mm. wide by 0.3–2.0 mm. long, cinereous to black; fruc-

tification compound with numerous ascocarps; asci cylindrical, 9–12 by 60–85  $\mu$ ; 8 ascospores, ellipsoid 4.5–7 by 9.5–13  $\mu$ , uniseriate; spermatia (?) in similar fructifications, filiform 0.5–1.0 by 12–18  $\mu$  continuous; conidia in similar fructifications 2.0 by 23–30  $\mu$ , 3-septate, slightly curved.

On Poaceae:

- Panicum obtusum* H.B.K. New Mexico, Oklahoma.  
*Paspalum ciliatifolium* Michx. Alabama, Florida, Georgia.  
*Paspalum epile* Nash. Alabama.  
*Paspalum Muhlenbergii* Nash. Alabama, Virginia.  
*Paspalum pubescens* Muhl. Illinois, Missouri, North Carolina, Virginia.  
*Paspalum pubiflorum* var. *glabrum* Vasey. Texas.  
*Paspalum setaceum* Michx. Alabama, District of Columbia, New Jersey, South Carolina.  
*Paspalum stramineum* Nash (*P. Bushii* Nash). Nebraska, Oklahoma, Texas, Wisconsin.  
*Paspalum supinum* Bosc. Missouri.  
*Paspalum* sp. Louisiana; Mississippi.

TYPE LOCALITY: Ocean Gate, New Jersey on *Paspalum setaceum*. (Wilson 792)

DISTRIBUTION: New York to Nebraska and south to New Mexico and Alabama.

EXSICCATI: Barth. Fungi Columb. 2742; Rabenhorst-Winter, Fungi Europaei 3061 (A).

18. PHYLLACHORA GUIANENSIS Stev. Ill. Biol. Monog. 8: 19. 1923.

- Phyalospora Panici* Rehm, Hedwigia 40: 114. 1901.  
*Phyllachora Panici* Theiss. & Syd. Ann. Myc. 13: 452. 1915.  
(Not *P. Panici* (Schw.) Sacc.)  
*Phyllachora microspora* Chardon, Bol. Real. Soc. Esp. Hist. Nat. 28: 119. 1928.  
*Phyllachora Paspali-virgati* Chardon, Jour. Dept. Agr. Puerto Rico 13: 14. 1929.  
*Phyllachora Leonardii* Chardon, Myc. Explor. Venez. Monog. Univ. Puerto Rico, Ser. B. 2: 157. 1934.

Clypei amphigenous, but more conspicuous on upper leaf surface, scattered, oval, rarely confluent, 0.15–0.3 mm. wide by

0.2–1.0 mm. long, black; fructification generally simple, occasionally compound; asci cylindrical, 8–10 by 55–70  $\mu$ ; 8 ascospores, narrowly ellipsoid, 3.5–5.0 by 7.5–11  $\mu$ , uniseriate; conidia sometimes present in similar fructifications, narrowly ellipsoid, 2-celled, 2.0–2.5 by 9.5–12  $\mu$ , hyaline.

On Poaceae:

*Panicum laxum* Sw. Puerto Rico.

*Paspalum ciliatifolium* Michx. Florida.

*Paspalum clavuliferum* Wright. Dominican Republic.

*Paspalum laeve* Michx. Louisiana.

*Paspalum virgatum* L. Puerto Rico; Cuba; Jamaica.

TYPE LOCALITY: Georgetown, British Guiana on *Paspalum virgatum*.

DISTRIBUTION: Gulf States, West Indies, Central and South America.

19. *Phyllachora tetrasporicola* Chardon, sp. nov.

Clypei amphigenous, more prominent on lower surface of leaf, scattered, circular to oval in outline, more rarely elongated and confluent; 0.3–0.5 mm. wide by 0.5–1.0 mm. long; fructification compound with few ascocarps, black and shiny; asci cylindrical, 8–10 by 65–85  $\mu$ ; 4 ascospores, fusiform to ovate-acuminate, 6–7 by 15–19  $\mu$ , uniseriate.

On Poaceae:

*Panicum pilosum* Swartz. Dominican Republic.

TYPE LOCALITY: Duarto Road, District Nacional, Dominican Republic. (Chardon 654)

DISTRIBUTION: Known only from type locality.

20. *PHYLLACHORA CORNISPORA* Atk. Bull. Cornell Univ. **3**: 11. 1897.

*Phyllachora acuminata* Starb. Archiv. Bot. **51**: 11. 1905.

*Phyllachora Chaetochloae* Stev. Ill. Biol. Monog. **8**: 19. 1923.

*Phyllachora cornispora-necrotica* Chardon, Bol. Real. Soc. Esp. Hist. Nat. **28**: 116. 1928.

*Phyllachora Ortonii* Chardon, Jour. Dept. Agr. Puerto Rico **13**: 11. 1929.

*Phyllachora Murilloi* Garces, Caldasia, No. 2, 86. 1941.

Clypei amphigenous but often more prominent on upper leaf surface, circular or oval to ellipsoid in outline, 0.15–0.5 mm. wide

by 0.5–1.5 mm. long, sometimes confluent to form lines up to 7 mm. long, occasionally forming oval necrotic spots several millimeters long, black; fructification usually compound with numerous ascocarps; asci cylindrical, rarely ellipsoid or saccate, 10–18 by 65–125  $\mu$ ; 8 ascospores, ovate-acuminate, more rarely fusiform 5.5–8.5 by 15–22  $\mu$ , biseriate or uniseriate; conidia fusiform, often curved, 3–4 by 25–35  $\mu$ , 2-celled; spermatia (?) cylindrical, filiform, 0.5 by 17–25  $\mu$ , continuous.

On Poaceae:

*Chaetochloa setosa* (Sw.) Scrib. Dominican Republic.

*Panicum agrostoides* Spreng. Alabama, Illinois.

*Panicum anceps* Michx. Georgia.

*Panicum glutinosum* Sw. Canal Zone.

*Panicum longifolium* Torr. Alabama.

*Paspalum distichum* L. Florida.

*Paspalum fasciculatum* Willd. Costa Rica.

*Paspalum laeve* Michx. Florida.

*Paspalum laxum* Lam. Puerto Rico.

*Paspalum millegrana* Schrad. Puerto Rico.

*Paspalum notatum* Flugge. Puerto Rico.

*Paspalum virgatum* L. Guatemala; Panama; Puerto Rico.

TYPE LOCALITY: Auburn, Alabama on *Panicum agrostoides*.

DISTRIBUTION: Southern United States; Central and South America; West Indies.

21. PHYLLACHORA HETEROSPORA P. Henn. DeWild. Mission E. Laurent 1: 362. 1907.

*Phyllachora Raciborskii* Theiss. & Syd. Ann. Myc. 13: 453. 1915.

*Phyllachora seriata* Theiss. & Syd. Ann. Myc. 13: 453. 1915.

*Phyllachora Vanderystii* Theiss. & Syd. Ann. Myc. 13: 455. 1915.

Clypei amphigenous, gregarious, circular to oval, rarely elliptical in outline, 0.2–1 mm. wide by 0.2–2 mm. long, often arranged in linear series up to 5 mm. long, black; fructification simple or compound with numerous ascocarps; asci ellipsoid to saccate, 12–22 by 75–125  $\mu$ ; 8 ascospores, narrowly ellipsoid, 6.5–7.5 by 13–19  $\mu$ , uniseriate or biseriate and sometimes inordinate.

On Poaceae:

*Pennisetum distachyum* (Four.) Rupr. Costa Rica.

TYPE LOCALITY: Congo, Africa, on *Panicum maximum*.

DISTRIBUTION: Central and South America; Africa; Java; Philippines.

22. PHYLLACHORA CONGRUENS Rehm, Leaf. Philipp. Bot. 6: 2220. 1914.

*Phyllachora microstroma* Chardon, Bol. Real Soc. Esp. Hist. Nat. 28: 118. 1928.

Clypei amphigenous or sometimes epiphyllous, circular or oval in outline, scattered, 0.1–0.3 mm. wide by 0.15–0.5 mm. long, sometimes confluent to form linear series up to 1 mm., black; fructification simple or compound with few ascocarps; asci ellipsoid, 10–15 by 40–70  $\mu$ ; 8 ascospores, fusiform or sometimes rounded at one end, 4.5–6 by 11–15  $\mu$ , biseriata.

On Poaceae:

*Panicum hians* Ell. Alabama.

*Panicum longifolium* Torr. New Jersey.

*Paspalum conjugatum* Berg. Puerto Rico.

*Paspalum saccharoides* Nees. Panama.

TYPE LOCALITY: Los Banos, Laguna, Philippine Islands, on *Panicum carinatum*.

DISTRIBUTION: New Jersey along coast to Texas, the West Indies, South America, South Africa and the Philippines.

23. PHYLLACHORA PARILIS Syd. Ann. Myc. 25: 3–4. 1927.

Clypei amphigenous but more conspicuous on lower leaf surface, circular to oval in outline, scattered, 0.5–1.0 mm. wide by 0.5–1.5 mm. long, brownish black; fructification compound; asci cylindrical, 9–12 by 60–80  $\mu$ ; 8 ascospores, broadly ellipsoid, 6.5–7.5 by 10–12  $\mu$ , uniseriate; spermatia (?) curved or cylindrical, 0.5–1.0 by 15–20  $\mu$ .

On Poaceae:

*Paspalum candidum* (H. & B.) Kunth. Costa Rica.

TYPE LOCALITY: Asseri, Costa Rica, on *Paspalum candidum*.

DISTRIBUTION: Costa Rica to South America.

24. PHYLLACHORA PASPALICOLA P. Henn. Hedwigia 48: 106. 1908.

*Phyllachora vaginata* Chardon, Jour. Dept. Agr. Puerto Rico  
16: 172. 1932.

Clypei amphigenous, circular or oval in outline, scattered, 0.1–0.3 mm. wide by 0.2–0.8 mm. long, black, shining; fructification simple or compound with few ascocarps; asci cylindrical, 8–12 by 65–80  $\mu$ ; 8 ascospores, ellipsoid, 4.5–7 by 9–14  $\mu$ , uniseriate; conidia in similar fructifications, fusoid, sometimes curved, 2–3 by 20–30  $\mu$ , mostly two-celled, hyaline.

On Poaceae:

*Digitaria horizontalis* Willd. Puerto Rico.

*Paspalum conjugatum* Berg. Costa Rica; Cuba; Puerto Rico.

*Paspalum distichum* L. Dominican Republic.

*Paspalum plicatulum* Michx. Canal Zone; Panama.

*Paspalum Saugetii* Chase. Dominican Republic.

*Paspalum tenellum* Willd. Panama.

*Paspalum vaginatum* Sw. Dominican Republic.

*Paspalum* sp. Florida.

TYPE LOCALITY: Para, Brazil, on *Paspalum* sp.

DISTRIBUTION: Central and South America, West Indies.

25. *PHYLLACHORA INSULARIS* Chardon, Jour. Dept. Agr. Puerto Rico 13: 13. 1929.

Clypei amphigenous but more conspicuous on upper leaf surface, scattered, margin indefinite, irregular in outline, 0.1–0.5 mm. wide by 0.2–1.6 mm. long, black; fructification compound with numerous ascocarps; asci cylindrical, 8–12 by 60–85  $\mu$ ; 8 ascospores, broadly ellipsoid, 4.5–6 by 8–11  $\mu$ , uniseriate; conidia in similar fructifications, lunate, 3–3.6 by 26–29  $\mu$ , one-celled, hyaline.

On Poaceae:

*Trichachne insularis* (L.) Nees (*Valota insularis* Chase).

Cuba; Dominican Republic; Grenada; Puerto Rico; St. Thomas, Jamaica.

*Trichachne patens* Swallen. Texas.

TYPE LOCALITY: Barceloneta, Puerto Rico, on *Valota insularis*.

DISTRIBUTION: South America and West Indies.

EXSICCATI: Ciferri, Myc. Doming. 214.



26. *Phyllachora leersiae* Chardon, Jour. Dept. Agr. Puerto Rico 16: 176. 1932.

Clypei amphigenous, scattered or in groups, circular in outline, 0.2–0.5 mm. across, black; fructification simple; asci cylindrical-clavate, fragile, 14–18 by 55–75  $\mu$ ; 8 ascospores, narrowly ellipsoid, 7.0–8.5 by 16–21  $\mu$ , biseriate.

On Poaceae:

*Leersia* (*monandra* Sw.?). Dominican Republic.

TYPE LOCALITY: Road to San Jose de las Matas, Prov. Santiago.

DISTRIBUTION: Known only from Dominican Republic.

27. *Phyllachora Phalaridis* sp. nov.

Clypei amphigenous but more conspicuous on upper leaf surface, scattered, ellipsoid to fusiform in outline, 0.2–0.5 mm. wide by 0.3–1.0 mm. long, shiny black; fructification simple or compound with few ascocarps; asci cylindrical, 7.5–9 by 70–80  $\mu$ ; 8 ascospores, broadly ellipsoid, 4–5 by 7.5–10  $\mu$ , uniseriate.

On Poaceae:

*Phalaris arundinacea* L. Massachusetts.

TYPE LOCALITY: Southwick, Massachusetts, on *Phalaris arundinacea*. (Seymour 250)

DISTRIBUTION: Known only from type locality.

28. *Phyllachora Ammophilae* sp. nov.

Clypei amphigenous but more conspicuous on upper leaf surface, scattered, linear, 0.2–1.0 mm. wide by 1.0–5.0 mm. long, brownish black; fructification compound with numerous ascocarps; asci cylindrical 10–15 by 90–115  $\mu$ ; 8 ascospores, broadly ellipsoid, 7–9 by 10–15  $\mu$ , often appearing subspherical, uniseriate.

On Poaceae:

*Ammophila arenaria* (L.) Link. Massachusetts, New Jersey, New York.

TYPE LOCALITY: Southhampton, New York, on *Ammophila arenaria*. (Orton, June 27, 1919)

DISTRIBUTION: Long Island, Massachusetts and New Jersey.

29. *Phyllachora Epicampis* sp. nov.

Clypei amphigenous but more conspicuous on upper leaf surface, scattered or gregarious, elliptical to linear in outline, 0.2–1.0 mm. wide by 1.0–3.0 mm. long, dull black, or grayish, often

confluent to form patches up to 2 cm. long; fructification compound with numerous ascocarps; asci cylindrical to clavate, 10-14 by 95-150  $\mu$ , with long pedicels; 8 ascospores, ovate-acuminate, 6-8 by 19-23  $\mu$ , uniseriate or biseriate.

On Poaceae:

*Muhlenbergia rigens* (Benth.) Hitchc. (*Epicampes rigens* Benth.). Arizona, California.

TYPE LOCALITY: Monrovia, California, on *Epicampes rigens*.

DISTRIBUTION: Arizona and California.

30. PHYLLACHORA VULGATA Theissen & Sydow, Ann. Myc. 13: 450. 1915.

*Sphaeria graminis cinerascens* Schw. Trans. Am. Phil. Soc. II. 4: 208. 1832.

*Sphaeria Agrostidis* Schw. Trans. Am. Phil. Soc. II. 4: 210. 1832.

Clypei amphigenous, scattered, oval to ellipsoid in outline, 0.1-1.0 mm. wide by 0.2-2.0 mm. long, dull black; fructification simple or compound, generally with few ascocarps; asci cylindrical, 7-11 by 65-110  $\mu$ ; ascospores ellipsoid, 4-5.5 by 9-12  $\mu$ , uniseriate.

On Poaceae:

*Blepharoneuron tricholepsis* (Torr.) Nash. New Mexico.

*Muhlenbergia asperifolia* (Nees & Mey.) Parodi (*Sporobolus asperifolius* Nees & Mey.). Colorado, Nebraska, New Mexico, North Dakota; British Columbia.

*Muhlenbergia californica* Vas. California.

*Muhlenbergia cuspidata* (Torr.) Rydb. (*Sporobolus cuspidatus* Wood. *S. brevifolius* (Nutt.) Scribn. *Vilfa cuspidata* Torr.). Indiana, Iowa, Minnesota, North Dakota, South Dakota, Wyoming.

*Muhlenbergia foliosa* (Roem. & Schult.) Trin. (*Agrostis filiformis* Willd.). Pennsylvania, Wisconsin.

*Muhlenbergia mexicana* (L.) Trin. Illinois, Indiana, Iowa, Maryland, Michigan, Nebraska, New York, Ohio, Pennsylvania, South Dakota, West Virginia; Ontario.

*Muhlenbergia montana* (Nutt.) Hitchc. (*M. gracilis* Auct.). Colorado.

*Muhlenbergia Porteri* Scribn. Arizona.

*Muhlenbergia racemosa* (Michx.) B.S.P. (*M. glomerata* Trin.). Colorado, Georgia, Illinois, Kansas, Michigan, Nebraska, New York, North Dakota, South Dakota, Wisconsin; Ontario.

*Muhlenbergia Reverchoni* Vasey & Scribn. Maryland.

*Muhlenbergia Schreberi* Gmel. (*M. diffusa* Willd.). Georgia, Illinois, Iowa, Louisiana, Maryland, Mississippi, New York, North Dakota, Pennsylvania, Tennessee, West Virginia.

*Muhlenbergia sobolifera* (Muhl.) Trin. Iowa, Pennsylvania.

*Muhlenbergia spiciformis* Trin. Jalisco.

*Muhlenbergia squarrosa* (Trin.) Rydb. New Mexico, North Dakota.

*Muhlenbergia sylvatica* Torr. Kansas, Maine, Missouri, Wisconsin.

*Muhlenbergia tenuiflora* (Willd.) B.S.P. Wisconsin.

*Muhlenbergia uniflora* (Muhl.) Fernald (*Sporobolus serotinus* A. Gray, *S. uniflorus* Scribn. & Merr.). Vermont.

*Muhlenbergia* sp. Alabama, Rhode Island.

*Sporobolus airoides* (Torr.) Torr. Colorado.

*Sporobolus argutus* (Nees) Kunth. Texas.

*Sporobolus asper* (Michx.) Kunth. Illinois.

*Sporobolus cryptandrus* (Torr.) A. Gray. Kansas, Texas.

*Sporobolus* sp. South Dakota.

TYPE LOCALITY: Saline River, Kansas, on *Muhlenbergia sylvatica*.

DISTRIBUTION: Southern Canada, United States, and in Mexico.

EXSICCATI: Barth. Fungi Columb. 2249, 2342, 2443, 3733, 3923; Brenckle, Fungi Dak. 8, 9; Ellis & Ev. Fungi Columb. 525; Griff. W. Am. Fungi 4.

### 31. *Phyllachora texensis* sp. nov.

Clypei amphigenous, scattered or sometimes gregarious, elliptical to fusiform in outline, 0.2-0.4 mm. wide by 1.0-1.5 mm. long, dull black; fructification compound with numerous ascarps; asci cylindrical, 7-11 by 100-120  $\mu$ , pedicels long; 8 ascospores, narrowly ellipsoid, 6.5-7.5 by 13-16  $\mu$ , uniseriate.

On Poaceae:

*Muhlenbergia Reverchoni* Vasey & Scribn. Texas.

TYPE LOCALITY: Fort Worth, Texas, on *Muhlenbergia Reverchoni*. (Reverchon 3539)

DISTRIBUTION: Known only from type locality.

32. *Phyllachora coloradensis* sp. nov.

Clypei amphigenous, scattered or gregarious, ellipsoid to linear in outline, 0.2–0.5 mm. wide by 0.5–1.5 mm. long, sometimes forming larger groups up to 5 mm. long, dull black; fructification usually compound; asci cylindrical, 9–12 by 70–85  $\mu$ ; 8 ascospores, narrowly ellipsoid, 5.5–6 by 11–14  $\mu$ , uniseriate; conidia present in similar fructifications, fusiform, 5.5–7 by 15–20  $\mu$ , four-celled, hyaline.

On Poaceae:

*Muhlenbergia Montana* (Nutt.) Hitchc. (*M. trifida* Hack.).  
Colorado.

TYPE LOCALITY: Pikes Peak, Colorado, on *Muhlenbergia trifida*.

DISTRIBUTION: Known only from type locality.

33. *Phyllachora Oryzopsidis* (Rehm) Theiss. & Sydow, Ann. Myc. 13: 451. 1915.

*Phyllachora graminis* f. *Oryzopsidis* Rehm, Ascomycetes 1916: (hyponym).

Clypei chiefly epiphyllous, slightly evident on under surface of leaf, scattered, elliptical to short linear in outline, 0.2–0.4 mm. wide by 0.3–1.0 mm. long, black, shiny; fructification compound with numerous ascocarps; asci cylindrical, 9–10 by 70–100  $\mu$ ; 8 ascospores, narrowly ellipsoid, 5–6.5 by 11–14  $\mu$ , uniseriate.

On Poaceae:

*Oryzopsis asperifolia* Michx. Massachusetts, Michigan, New York, Vermont; Ontario, Quebec.

TYPE LOCALITY: London, Ontario, on *Oryzopsis asperifolia*.

DISTRIBUTION: New England west to Michigan and north into Canada.

EXSICCATI: Rehm, Ascom. 1916. Barth. Fungi Columb. 3536.

34. *Phyllachora BOUTELOUAE* Rehm, Hedwigia 36: 373. 1897.

*Phyllachora boutelouicola* Speg. Anal. Mus. Nac. Buenos Aires III. 12: 415. 1909.

*Phyllachora chloridicola* Speg. Anal. Mus. Nac. Buenos Aires III. 12: 416. 1909.

*Phyllachora minima* Chardon, Jour. Dept. Agr. Puerto Rico 16: 175. 1932.

Clypei amphigenous but more conspicuous on upper leaf surface, oval to elliptical in outline, scattered, sometimes confluent, 0.3–1 mm. wide by 0.5–2.0 mm. long, brownish black; fructification generally compound with few to numerous ascocarps; asci cylindrical, 9–12 by 75–95  $\mu$ , operculum prominent; 8 ascospores, broadly ellipsoid, 5–6 by 8.5–11  $\mu$ , uniseriate.

On Poaceae:

*Bouteloua curtipendula* (Michx.) Torr. Illinois, Texas, Wisconsin.

*Bouteloua gracilis* (H.B.K.) Lag. (*B. oligostachya* Torr.). Nebraska, New Mexico, North Dakota, South Dakota.

*Bouteloua heterostega* (Trin.) Griff. Dominican Republic; Puerto Rico.

*Bouteloua hirsuta* Lag. Wisconsin.

*Buchloe dactyloides* (Nutt.) Engelm. (*Bulbilis dactyloides* Raf.). Arkansas, Kansas, Texas.

*Chloris chloridea* (Presl.) Hitchc. Texas.

*Chloris orthonoton* Doell. Guatemala.

*Chloris submutica* H.B.K. Coahuila.

*Chloris virgata* Sw. Lower California.

TYPE LOCALITY: Argentina on *Bouteloua curtipendula* var. *aristosa*.

DISTRIBUTION: Wisconsin to Nebraska, south to Mexico and in South America.

35. PHYLLACHORA LEPTOCHLOAE Chardon, Jour. Dept. Agr. Puerto Rico 16: 176. 1932.

Clypei amphigenous, oval to elliptical, sometimes linearly extended to produce an irregular outline, scattered, rarely confluent, 0.3–1 mm. wide by 0.7–3 mm. long, black, somewhat shiny; fructification compound with few to numerous ascocarps; asci cylindrical, 9.5–13 by 75–95  $\mu$ ; 8 ascospores, ovate-acuminate or fusiform, 5–6 by 14–19  $\mu$ , chiefly uniseriate; spermatia sinuous, 1.0 by 15–20  $\mu$ , continuous.

On Poaceae:

*Leptochloa virgata* (L.) Beauv. Canal Zone; Honduras.

TYPE LOCALITY: La Fragua, Honduras, on *Leptochloa virgata*.

DISTRIBUTION: Central America to Venezuela.

36. *Phyllachora serialis* Ellis & Ev. Jour. Myc. 8: 18. 1902.

Clypei poorly developed, amphigenous but more conspicuous on under surface of the leaf, elliptical to linear in outline, 0.1–0.2 mm. wide by 0.5–1 mm. long, gregarious, often confluent to form lines up to 5 mm. long; fructification simple or rarely compound; asci cylindrical, 10–15 by 70–80  $\mu$ ; 8 ascospores, ellipsoid, 5–6 by 10–13  $\mu$ , uniseriate.

On Poaceae:

*Elymus triticoides* Buckl. California.

*Spartina leiantha* Benth. California.

TYPE LOCALITY: Pacific Grove, California, on *Spartina stricta*, error for *S. leiantha*.

DISTRIBUTION: Known only from type locality.

37. *Phyllachora Spartinae* sp. nov.

Clypei chiefly epiphyllous, slightly noticeable on under leaf surface, elliptical to linear, 0.5–1.0 mm. wide by 2.0–3.0 mm. long, scattered, grayish to shining black; fructification compound with numerous ascocarps; asci cylindrical to narrowly ellipsoid, 15–20 by 90–110  $\mu$ ; ascospores, broadly ovoid to broadly ellipsoid, often appearing nearly spherical, 9–12 by 15–19  $\mu$ , uniseriate.

On Poaceae:

*Spartina alterniflora* Lois. Florida, Georgia, Maryland.

TYPE LOCALITY: Savannah, Georgia, on *Spartina alterniflora*.

DISTRIBUTION: Along the coast from Maryland to Florida.

38. *Phyllachora Pammelii* sp. nov.

Clypei amphigenous, scattered, elliptical to linear in outline, 0.2–0.6 mm. wide by 0.5–2 mm. long, black, not shining; fructification compound with numerous ascocarps; asci cylindrical, 8–12 by 70–80  $\mu$ ; ascospores fusiform, 4.5–5 by 10–14  $\mu$ , uniguttulate, uniseriate or occasionally biseriata.

On Poaceae:

*Distichlis stricta* (Torr.) Rydb. Colorado.

TYPE LOCALITY: Fort Collins on *Distichlis stricta*.

DISTRIBUTION: Known only from type locality.

39. *Phyllachora diplocarpa* Ellis & Ev. Bull. Torrey Club 24: 292. 1897.

*Phyllachora Nuttalliana* Fairm. in Millsp. & Nutt. Pub. Field Mus. Nat. Hist. 5: 345. 1923.

Clypei hypophyllous chiefly, oval to elliptical in outline, 0.2–0.5 mm. wide by 0.5–1.0 mm. long, more rarely up to 2.0 mm. long, scattered or sometimes confluent to form larger groups, dull black; fructification compound, with few ascocarps, flattened in the scanty mesophyll; asci clavate or somewhat saccate, more rarely cylindrical, 11–14 by 50–60  $\mu$ , often with prominent pedicel; 8 ascospores, narrowly ellipsoid, 4.5–5.5 by 13–17  $\mu$ , uniseriate or partially biseriata, or more generally inordinate.

On Poaceae:

*Distichlis spicata* (L.) Greene (*D. maritima* Raf.). California, Colorado, Kansas, New Mexico, South Dakota, Texas.

*Distichlis stricta* (Torr.) Rydb. California, North Dakota, Texas.

*Spartina patens* (Ait.) Muhl. South Carolina.

TYPE LOCALITY: Rooks County, Kansas, on *Distichlis maritima*.

DISTRIBUTION: On plains from North Dakota to New Mexico and on the Pacific coast, mostly on alkaline soils.

EXSICCATI: Barth. Fungi Columb. 4745; Brenckle, Fungi Dak. 10; Ellis & Ev. Fungi Columb. 955; Ellis & Ev. N. Am. Fungi 3439; Griff. W. Am. Fungi 2.

40. PHYLLACHORA ERAGROSTIDIS Chardon, Bol. Soc. Venez. Cien. Natur. 40: 17 (?). 1939.

Clypei amphigenous, scattered, oval to elliptical in outline, 0.1–0.4 mm. wide by 0.5–1.5 mm. long, sometimes confluent to form wider and longer patches, black; fructification compound with numerous ascocarps; asci cylindrical, 8–10 by 80–100  $\mu$ ; ascospores narrowly ovoid to ellipsoid, 4.5–6 by 10–13  $\mu$ , uniseriate; form on *Triodia flava* with ascospores 4.5–5.0 by 6.0–8.0  $\mu$ .

On Poaceae:

*Eragrostis capillaris* (L.) Nees (*E. tenuis* Steud.). Alabama, Nebraska, Texas.

*Eragrostis hirsuta* (Michx.) Nees. Georgia.

*Eragrostis Palmeri* S. Wats. Texas.

*Eragrostis* sp. New Mexico.

*Triodia albescens* Vasey. Texas.

*Triodia flava* (L.) Smyth (*Tridens flavus* Hitchc.). Georgia, Texas.

TYPE LOCALITY: Miranda, Venezuela, on *Eragrostis polytricha*.

DISTRIBUTION: Georgia to Nebraska and Texas; also in South America.

41. PHYLLACHORA SILVATICA Sacc. & Speg. Mich. 1: 410. 1878.

Clypei mostly hypophyllous, scattered or often gregarious, roundish or oval in outline, 0.4–0.8 mm. wide by 0.5–1 mm. long, black; fructification compound with few ascocarps; asci cylindrical or narrowly elliptical, 10–15 by 75–100  $\mu$ ; 8 ascospores, ellipsoid to fusiform or ovoid, 6.0–7.5 by 12–16  $\mu$ , biseriate or uniseriate.

On Poaceae:

*Festuca dertonensis* (All.) Aschers. & Graebn. Oregon.

*Festuca idahoensis* Elmer. California.

*Festuca megalura* Nutt. Oregon.

*Festuca occidentalis* Hook. Oregon.

*Festuca rubra* L. California, Oregon.

TYPE LOCALITY: Northern Italy on *Festuca duriuscula*.

DISTRIBUTION: Northwestern United States and Northern Italy.

42. PHYLLACHORA GRAMINIS (Pers.) Fuckel, Symb. Myc. 216. 1869.

*Sphaeria graminis* Pers. Obs. Myc. 18. 1796.

*Phyllachora graminis* Elymorum Fries, Syst. Myc. 2: 434. 1823.

*Sphaeria graminis* Elymorum Schw. Trans. Am. Phil. Soc. II. 4: 208. 1832.

*Dothidea graminis* Fries, Summa Veg. 387. 1845.

*Phyllachora Bromi* Fuckel, Symb. Myc. 216. 1869.

*Phyllachora Asperellae* Roum. & Fautr. Rev. Myc. 175. 1892. Roum. Fungi Sel. Exs. 6173.

*Phyllachora graminis* f. *Hystricis* Rehm, Ascom. 1917 (hyponym).

*Phyllachora Agrostidis* Orton, House, N. Y. State Mus. Bull. 243–244: 91. 1923 (homonym).

*Phyllachora Elymi* Orton, House, N. Y. State Mus. Bull. 243–244: 92. 1923 (hyponym).

*Phyllachora Melicae* Dearn & House, N. Y. State Mus. Bull. 266–270. 1925.



*Phyllachora Cinnae* Tehon & Dan. Mycologia 19: 110. 1927.

Clypei amphigenous, scattered, long elliptical to linear, often fusiform in outline, 0.1–1.0 mm. wide by 0.2–5.0 mm. long, frequently confluent, black; fructification compound with many ascocarps; asci cylindrical, 8–10 by 70–100  $\mu$ ; 8 ascospores, ellipsoid, 4.5–6 by 9–12  $\mu$ , uniseriate.

*Agropyron cristatum* Beauv. Nova Scotia.

*Agropyron pauciflorum* (Schwein.) Hitchc. New York.

*Agropyron repens* (L.) Beauv. Iowa, Maine, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, Wisconsin; Alberta, Ontario, Quebec.

*Agrostis alba* L. California, New York, Virginia.

*Brachyletrum erectum* (Schreb.) Beauv. Nebraska, Vermont.

*Bromus ciliatus* L. Indiana, Wisconsin.

*Bromus purgans* L. Pennsylvania.

*Bromus trinii* Desv. California.

*Calamagrostis canadensis* (L.) Beauv. Michigan, Nebraska, New York, Wisconsin.

*Cinna arundinaceae* L. Illinois, Kansas, Maryland, Virginia.

*Elymus canadensis* L. Illinois, Indiana, Iowa, Maryland, Michigan, Minnesota, Mississippi, Nebraska, New York, North Dakota, Ohio, Pennsylvania, South Dakota, Vermont, Virginia, West Virginia, Wisconsin, District of Columbia.

*Elymus canadensis* var. *brachystachys* Farwell. Wisconsin.

*Elymus canadensis* var. *robustus* (Scribn. & Sm.) Mackenz. & Bush. Illinois, Kansas, Minnesota, Vermont; Ontario.

*Elymus condensatus* Presl. California.

*Elymus glaucus* Buckl. California, Montana, New York.

*Elymus riparius* Wieg. New York, Pennsylvania, West Virginia.

*Elymus triticoides* Buckl. California.

*Elymus virginicus* L. (*Elymus striatus* Willd.). Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New York, Ohio, Pennsylvania, South Dakota, Virginia, West Virginia, Wisconsin, District of Columbia; Ontario.

*Elymus virginicus* var. *australis* (Scribn. & Ball) Hitchc.  
Georgia, Missouri, North Carolina.

*Elymus virginicus* var. *glabriflorus* (Vasey) Bush. Pennsylv-  
vania, West Virginia.

*Elymus virginicus* var. *halophilus* (Bick.) Wieg. Massachu-  
setts.

*Elymus virginicus* var. *intermedius* (Vasey) Bush. Missouri,  
Pennsylvania.

*Elymus virginicus* var. *submuticus* Hook. North Dakota.

*Festuca elatior* (L.) Chase. Maine.

*Hordeum jubatum* L. Wisconsin.

*Hordeum* sp. California.

*Hystrix patula* Moench (*Hystrix Hystrix* (L.) Millsp.). Illi-  
nois, Indiana, Iowa, Kentucky, Michigan, New Jersey,  
New York, Ohio, Pennsylvania, Vermont, Virginia, West  
Virginia, Wisconsin; Ontario.

*Melica striata* (Michx.) Hitchc. Wisconsin.

*Panicum virgatum* L. Iowa, Kansas, Kentucky, Maryland,  
Nebraska, New York, North Carolina, Rhode Island,  
Wisconsin.

*Pappophorum mucronulatum* Nees. Texas.

*Phleum pratense* L. Maine; Prince Edward Island.

*Triticum aestivum* L. Iowa.

*Uniola laxa* (L.) B.S.P. Georgia.

TYPE LOCALITY: Europe on *Elymus europeus*.

DISTRIBUTION: Around the world, chiefly in North Temperate  
zone.

EXSICCATI: Barth. Fungi Columb. 2947, 3921, 3922; Seym. &  
Earl. Econ. Fungi 395; Kell. Ohio Fungi 50; Ellis & Ev. Fungi  
Columb. 2133, 2134; Ellis & Ev. N. Am. Fungi 2127; Rab. &  
Winter. Fungi Eur. 3061(b); Rehm, Ascom. 1917; Ellis, N. Am.  
Fungi 484; Davis, Fungi Wisc. Exs. 39; Wils. & Seav. Ascom. &  
Lower Fungi 42; N. Dak. Fungi 16; Guba, Fungi of Nantucket  
160, 161.

#### 43. *Phyllachora Arundinariae* sp. nov.

Clypei small, amphigenous, scattered, or sometimes gregarious,  
oval to elliptical in outline, 0.1–0.4 mm. wide by 0.1–0.8 mm.  
long, black; fructification simple or compound with few asco-

carps; asci narrowly ellipsoid, 12-18 by 75-100  $\mu$ ; 8 ascospores fusiform to narrowly ellipsoid, 6-8.5 by 15-20  $\mu$ , biseriate or more rarely uniseriate.

On Poaceae:

*Arthrostyloidium angustifolium* Nash. Cuba.

*Arundinaria tecta* (Walt.) Muhl. Alabama, Georgia, South Carolina.

TYPE LOCALITY: Darien, Georgia, on *Arundinaria tecta*.

DISTRIBUTION: Alabama to Georgia and the West Indies.

EXSICCATI: Ravenel, Fungi Am. 389.

44. *Phyllachora excelsior* sp. nov.

Clypei amphigenous, scattered, oval to ellipsoid in outline, 1 mm. wide by 2 mm. long, black, often located on necrotic or chlorotic spots; fructification compound with numerous ascocarps; asci cylindrical or narrowly ellipsoid, 15-25 by 150-180  $\mu$ ; 8 ascospores, ovate-acuminate to fusiform, 9-10 by 30-38  $\mu$ , biseriate or uniseriate.

On Poaceae:

*Arthrostyloidium excelsum* Griseb. Guadeloupe.

TYPE LOCALITY: Guadeloupe on *Arthrostyloidium excelsum*.

DISTRIBUTION: Known only from type locality.

45. *Phyllachora portoricensis* (Chardon) comb. nov.

*Spaerodothis portoricensis* Chardon, Jour. Dept. Agr. Puerto Rico 16: 189 1932.

*Phyllachora Arthrostyloidii* Pet. & Cif. Ann. Myc. 30: 232. 1932.

Clypei amphigenous, scattered, ellipsoid to linear, 0.2-0.7 mm. wide by 0.7-4 mm. long, black; fructification compound with numerous ascocarps; asci clavate, 20-25 by 90-120  $\mu$ ; 8 ascospores narrowly ovoid, 7.5-9.5 by 19-24  $\mu$ , usually biseriate.

On Poaceae:

*Arthrostyloidium multispicatum* Pilger. Dominican Republic.

*Arthrostyloidium sarmentosum* Pilger. Puerto Rico.

TYPE LOCALITY: Loquillo Mts., Puerto Rico, on *Arthrostyloidium sarmentosum*.

DISTRIBUTION: Known only from the West Indies.

46. *PHYLLACHORA TETRASPORA* Chardon, Jour. Dept. Agr. Puerto Rico 16: 178. 1932.

Clypei chiefly epiphyllous, scattered, linear, 0.5–1.0 mm. wide by 2.5 mm. long, black; fructification compound; asci clavate, 12–14 by 60–85  $\mu$ ; 4 ascospores, irregularly arranged, narrowly ellipsoid, 6–7.5 by 18–22  $\mu$ ; wall rather thick.

On Poaceae:

*Bambos vulgaris* Schrad. Dominican Republic.

TYPE LOCALITY: Santiago, Dominican Republic, on *Bambusa vulgaris*.

DISTRIBUTION: West Indies and South America.

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<i>Ammophila arenaria</i> .....	39	<i>Cenchrus incertus</i> .....	30
<i>Andropogon bicornis</i> .....	25, 26	<i>Cenchrus myosuroides</i> .....	30
<i>Andropogon brevifolius</i> .....	27	<i>Cenchrus viridis</i> .....	30
<i>Andropogon Elliotii</i> .....	25	<i>Chaetochloa setosa</i> .....	36
<i>Andropogon fastigiatus</i> .....	26	<i>Chloris chloridea</i> .....	43
<i>Andropogon furcatus</i> .....	27	<i>Chloris orthonoton</i> .....	43
<i>Andropogon glomeratus</i> .....	25	<i>Chloris submutica</i> .....	43
<i>Andropogon Hallii</i> .....	27	<i>Chloris virgata</i> .....	43
<i>Andropogon leucostachyus</i> .....	26	<i>Cinna arundinacea</i> .....	47
<i>Andropogon longiberbis</i> .....	25	<i>Digitaria horizontalis</i> .....	38
<i>Andropogon perforatus</i> .....	27	<i>Digitaria maritima</i> .....	45
<i>Andropogon provincialis</i> .....	27	<i>Distichlis spicata</i> .....	45
<i>Andropogon var. furcatus</i> .....	27	<i>Distichlis stricta</i> .....	44, 45
<i>Andropogon saccharoides</i> .....	27	<i>Elymus canadensis</i> .....	47
<i>Andropogon scoparius</i> .....	27	<i>Elymus canadensis</i> var. <i>brachy-</i> <i>stachys</i> .....	47
<i>Andropogon semiberbis</i> .....	26	<i>Elymus canadensis</i> var. <i>robustus</i> .....	47
<i>Andropogon ternarius</i> .....	25	<i>Elymus condensatus</i> .....	47
<i>Andropogon virginicus</i> .....	27	<i>Elymus europeus</i> .....	48
<i>Arthephora hermaphrodita</i> .....	29	<i>Elymus glaucus</i> .....	47
<i>Arthrostylidium angustifolium</i> .....	49	<i>Elymus riparius</i> .....	47
<i>Arthrostylidium excelsum</i> .....	49	<i>Elymus striatus</i> .....	47
<i>Arthrostylidium multispicatum</i> .....	49	<i>Elymus triticoides</i> .....	44, 47
<i>Arthrostylidium sarmentosum</i> .....	49	<i>Elymus virginicus</i> .....	47
<i>Arundinaria tecta</i> .....	49	<i>Elymus virginicus</i> var. <i>australis</i> .....	48
<i>Arundinella confinis</i> .....	29	<i>Elymus virginicus</i> var. <i>glabriflorus</i> .....	48
<i>Arundinella martinecensis</i> .....	29	<i>Elymus virginicus</i> var. <i>halophilus</i> .....	48
<i>Bambos vulgaris</i> .....	50	<i>Elymus virginicus</i> var. <i>inter-</i> <i>medius</i> .....	48
<i>Blepharoneuron tricholepsis</i> .....	40	<i>Elymus virginicus</i> var. <i>submuticus</i> .....	48
<i>Bouteloua curtipendula</i> .....	43	<i>Epicampes rigens</i> .....	40
<i>Bouteloua gracilis</i> .....	43	<i>Eragrostis capillaris</i> .....	45
<i>Bouteloua heterostega</i> .....	43	<i>Eragrostis hirsuta</i> .....	45
<i>Bouteloua hirsuta</i> .....	43	<i>Eragrostis Palmeri</i> .....	45
<i>Bouteloua oligostachya</i> .....	43	<i>Eragrostis polytricha</i> .....	45
<i>Brachyletrum erectum</i> .....	47		
<i>Bromus ciliatus</i> .....	47		

<i>Eragrostis tenuis</i> .....	45	<i>Oplismenus hirtellus</i> .....	32
<i>Erianthus alopecuroides</i> .....	28	<i>Oplismenus Humboldtianus</i> .....	32
<i>Erianthus breviparbis</i> .....	28	<i>Oplismenus setarius</i> .....	32
<i>Erianthus contortus</i> .....	28	<i>Oryzopsis asperifolia</i> .....	42
<i>Erianthus divaricatus</i> .....	28	<i>Panicum agrostoides</i> .....	36
<i>Erianthus giganteus</i> .....	28	<i>Panicum anceps</i> .....	36
<i>Eriochloa annulata</i> .....	31	<i>Panicum boreale</i> .....	32
<i>Eriochloa punctata</i> .....	31	<i>Panicum Boscii</i> .....	32
<i>Eriochloa subglabra</i> .....	31	<i>Panicum carinatum</i> .....	37
<i>Festuca dertonensis</i> .....	46	<i>Panicum clandestinum</i> .....	32
<i>Festuca duriuscula</i> .....	46	<i>Panicum commutatum</i> .....	32
<i>Festuca elatior</i> .....	48	<i>Panicum consanguineum</i> .....	32
<i>Festuca idahoensis</i> .....	46	<i>Panicum depauperatum</i> .....	32
<i>Festuca megalura</i> .....	46	<i>Panicum dichotomum</i> .....	32
<i>Festuca occidentalis</i> .....	46	<i>Panicum flavovirens</i> .....	32
<i>Festuca rubra</i> .....	46	<i>Panicum geminatum</i> .....	33
<i>Hordeum jubatum</i> .....	48	<i>Panicum glutinosum</i> .....	36
<i>Hystrix Hystrix</i> .....	48	<i>Panicum Helleri</i> .....	32
<i>Hystrix patula</i> .....	48	<i>Panicum hians</i> .....	37
<i>Imperata brasiliensis</i> .....	28	<i>Panicum huachucae</i> .....	32
<i>Imperata contracta</i> .....	28	<i>Panicum implicatum</i> .....	32
<i>Lasiacis divaricata</i> .....	31	<i>Panicum Joorii</i> .....	32
<i>Lasiacis Swartziana</i> .....	31	<i>Panicum lancearium</i> .....	32
<i>Leersia</i> .....	39	<i>Panicum lanuginosum</i> .....	32
<i>Leptochloa virgata</i> .....	43	<i>Panicum latifolium</i> .....	32
<i>Leptoloma cognatum</i> .....	32	<i>Panicum laxum</i> .....	35
<i>Melica striata</i> .....	48	<i>Panicum Lindheimeri</i> .....	32
<i>Muhlenbergia asperifolia</i> .....	40	<i>Panicum linearifolium</i> .....	32
<i>Muhlenbergia californica</i> .....	40	<i>Panicum longifolium</i> .....	36, 37
<i>Muhlenbergia cuspidata</i> .....	40	<i>Panicum microcarpon</i> .....	33
<i>Muhlenbergia diffusa</i> .....	41	<i>Panicum maximum</i> .....	37
<i>Muhlenbergia foliosa</i> .....	40	<i>Panicum nitidum</i> .....	32
<i>Muhlenbergia glomerata</i> .....	41	<i>Panicum obtusum</i> .....	34
<i>Muhlenbergia gracilis</i> .....	40	<i>Panicum pacificum</i> .....	33
<i>Muhlenbergia mexicana</i> .....	40	<i>Panicum pedicellatum</i> .....	33
<i>Muhlenbergia montana</i> .....	40, 42	<i>Panicum pilosum</i> .....	35
<i>Muhlenbergia Porteri</i> .....	40	<i>Panicum scabriusculum</i> .....	33
<i>Muhlenbergia racemosa</i> .....	41	<i>Panicum scoparium</i> .....	33
<i>Muhlenbergia Reverchoni</i> .....	41	<i>Panicum Scribnerianum</i> .....	33
<i>Muhlenbergia rigens</i> .....	40	<i>Panicum sphaerocarpon</i> .....	33
<i>Muhlenbergia Schreberi</i> .....	41	<i>Panicum tennesseense</i> .....	33
<i>Muhlenbergia sobolifera</i> .....	41	<i>Panicum virgatum</i> .....	48
<i>Muhlenbergia spiciformis</i> .....	41	<i>Panicum Wrightianum</i> .....	33
<i>Muhlenbergia squarrosa</i> .....	41	<i>Panicum xalapense</i> .....	33
<i>Muhlenbergia sylvatica</i> .....	41	<i>Pappophorum mucronulatum</i> .....	48
<i>Muhlenbergia tenuiflora</i> .....	41	<i>Paspalum Bushii</i> .....	34
<i>Muhlenbergia trifida</i> .....	42	<i>Paspalum candidum</i> .....	37
<i>Muhlenbergia uniflora</i> .....	41	<i>Paspalum ciliatifolium</i> .....	34, 35
<i>Oplismenus Burmanni</i> .....	32		

<i>Paspalum clavuliferum</i> .....	35	<i>Schizachyrium scoparium</i> .....	27
<i>Paspalum conjugatum</i> .....	37, 38	<i>Sorghastrum nutans</i> .....	27
<i>Paspalum distichum</i> .....	36, 38	<i>Sorghastrum parviflorum</i> .....	28
<i>Paspalum epile</i> .....	34	<i>Spartina alterniflora</i> .....	44
<i>Paspalum fasciculatum</i> .....	36	<i>Spartina leiantha</i> .....	44
<i>Paspalum laeve</i> .....	35, 36	<i>Spartina patens</i> .....	45
<i>Paspalum laxum</i> .....	36	<i>Sporobolus airoides</i> .....	41
<i>Paspalum millegrana</i> .....	36	<i>Sporobolus argutus</i> .....	41
<i>Paspalum Muhlenbergii</i> .....	34	<i>Sporobolus asper</i> .....	41
<i>Paspalum notatum</i> .....	36	<i>Sporobolus asperifolius</i> .....	40
<i>Paspalum plicatulum</i> .....	38	<i>Sporobolus cryptandrus</i> .....	41
<i>Paspalum pubescens</i> .....	34	<i>Sporobolus cuspidatus</i> .....	40
<i>Paspalum pubiflorum</i> var. <i>glabrum</i> .....	34	<i>Sporobolus serotinus</i> .....	41
<i>Paspalum saccharoides</i> .....	37	<i>Sporobolus uniflorus</i> .....	41
<i>Paspalum saugetii</i> .....	38	<i>Stenotaphrum secundatum</i> .....	30
<i>Paspalum setaceum</i> .....	34	<i>Trichachne insularis</i> .....	38
<i>Paspalum stramineum</i> .....	34	<i>Trichachne patens</i> .....	38
<i>Paspalum supinum</i> .....	34	<i>Tridens flavus</i> .....	45
<i>Paspalum tenellum</i> .....	38	<i>Triodia albescens</i> .....	45
<i>Paspalum vaginatum</i> .....	38	<i>Triodia flava</i> .....	45
<i>Paspalum virgatum</i> .....	35, 36	<i>Tripsacum dactyloides</i> .....	25
<i>Pennisetum distachyum</i> .....	37	<i>Triticum aestivum</i> .....	48
<i>Phalaris arundinacea</i> .....	39	<i>Uniola laxa</i> .....	48
<i>Phleum pratense</i> .....	48	<i>Valota insularis</i> .....	38
<i>Rotboellia rugosa</i> .....	26	<i>Vilfa cuspidata</i> .....	40
		<i>Zea Mays</i> .....	25

## ADDITIONS TO THE UREDINALES OF VENEZUELA—III<sup>1</sup>

FRANK D. KERN AND H. W. THURSTON, JR.

Previous lists of Venezuelan Uredinales are as follows:

SYDOW, H. Fungi venezuelani [Uredinales]. Ann. Myc. 28: 37-52. 1930.

KERN, THURSTON & WHETZEL. Uredinales in Mycological Explorations of Venezuela. Monog. Univ. Puerto Rico B. 2: 262-303. 1934.

KERN, FRANK D. Additions to the Uredinales of Venezuela. Mycologia 30: 537-552. 1938.

KERN & THURSTON. Additions to the Uredinales of Venezuela—II. Mycologia 35: 434-445. 1943.

The total number of species reported in the foregoing lists is 238. We are now adding 25 species, bringing the total up to 263 species belonging to 31 genera. For notes concerning the collectors who have made possible these additions see KERN & THURSTON (l.c.), pp. 434-435. In the following list we are including notes about four species previously reported; these species which do not represent new records for Venezuela are marked with an asterisk.

For the determination of certain host plants we are indebted to Dr. E. P. Killip, Smithsonian Institution, Dr. H. A. Gleason, New York Botanical Garden, and Dr. R. E. Woodson, Jr., Missouri Botanical Garden; for aid in the preparation of the Latin diagnoses we are indebted to Dr. R. E. Dengler, The Pennsylvania State College.

AECIDIUM JACQUEMONTIAE Ellis & Ev. Jour. Myc. 8: 11. 1902.

On *Jacquemontia lactescens* Seem. Road Maracay a Guigue, Est. Aragua, March 31, 1939, Chardon, Whetzel & Müller 3254.

<sup>1</sup> Contribution from the Department of Botany, The Pennsylvania State College, No. 139. Publication authorized August 30, 1943, as paper No. 1191 in the Journal Series of the Pennsylvania Agricultural Experiment Station.



This rust has been reported previously from Yucatan and Panama. In N. Am. Flora 7: 634, 1924, Arthur uses the name *Thyella hirtiflora* (Mart. & Gall.) House for the host here listed.

ANGIOPSORA ZEAЕ Mains, Mycologia 30: 42. 1938.

On *Zea Mays* L. Gardens, Central Lucinda, Est. Carabobo, April 13, 1938, C. E. Chardon 2590; Hacienda Bramon, Est. Tachira, May 10, 1934, Kern & Toro 1812.

The pale yellow uredinia, the colorless or pale uredospores, and the covered telia with teliospores in catenulate rows are characteristics of this rust. For many years it was recognized that there was a rust of corn in southern and tropical regions which was distinct from the common rust of the temperate zone, *Puccinia Sorghi*. This rust has been called *Puccinia pallescens*. It is now believed that *P. pallescens* occurs only on *Tripsacum*. It is also an *Angiopsora* and not a *Puccinia*. The uredospores of *Angiopsora pallescens* are smaller than those of the corn rust and the telia differ in several important respects. These facts led Mains to propose the name *Angiopsora Zeae*. Teliospores on corn are apparently rather rare. They are present on our specimen No. 2590.

Mains reports *A. Zeae* from Guatemala, Puerto Rico, and Trinidad. In addition to these Venezuelan specimens we have specimens from the Dominican Republic and Colombia.

ARTHURIA COLUMBIANA (Kern & Whet.) Cummins, Bull. Torrey Club 70: 519. 1943.

*Phakopsora columbiana* Kern & Whet. Jour. Dept. Agr. Puerto Rico 14: 304. 1930.

On *Croton* sp. Taquara, Dist. Federal, Feb. 12, 1939, F. Tamayo 2381.

This species is otherwise known only from the type locality in Colombia. Dr. Cummins has discovered that the uredospores are catenulate and not stalked and has made the transfer to the genus *Arthuria*.

CHRYSOCYCLUS MIKANIAE (Arth.) Sydow, Ann. Myc. 23: 324. 1925.

On *Mikania* sp. Road Maracay a Choroni, Est. Aragua, March 26, 1939, *Chardon & Whetzel* 3168.

Previous reports of this species are from Brazil and Bolivia.

DASYSPORA GREGARIA (Kunze) P. Henn. *Hedwigia* **35**: 320. 1896.

On *Xylopia* sp. Road Maracay a Guigue, Est. Aragua, March 31, 1939, *Chardon, Whetzel & Müller* 3250.

This interesting species is often called *Dasyspora foveolata* Berk. & Curt. Mains (Carnegie Inst. Wash. Publ. No. **461**: 103-104, 1935) has discussed the nomenclature and illustrated the spore-stages. Our specimen has only teliospores. They are *Puccinia*-like with filiform appendages at each end. The uredinial stage is hyphomycete-like with spores borne on branched multicellular hyphae which protrude from the stomata. It is the uredinial stage which precludes the rust from belonging to the genus *Puccinia*. *Dasyspora* is a monotypic genus; it is now known from British Honduras, Costa Rica, Panama, Brazil, Surinam (type locality), and Venezuela.

PHAKOPSORA AESCHYNOMENIS Arth. Bull. Torrey Club **44**: 509. 1917.

On *Aeschynomene americana* L. Caracas, Dist. Federal, June 26, 1938, *A. S. Müller* 2186.

This rust is widely distributed in the West Indies and in Mexico. The only other record known to us from South America is that of Mayor in Colombia (Mem. Soc. Neuch. Sci. Nat. **5**: 586-587, 1913).

\*PHAKOPSORA CHERIMOLIAE (Lagerh.) Cummins, Bull. Torrey Club **68**: 467. 1941.

*Uredo Cherimoliae* Lagerh. Bull. Soc. Myc. Fr. **11**: 215. 1895.  
*Physopella Cherimoliae* Arth. Résult. Sci. Congr. Bot. Vienne **338**. 1906.

Dr. Cummins working with a specimen from Guatemala has found teliospores so that the reference to the genus *Phakopsora* is possible. The rust occurs in tropical regions of the Americas from Florida to Ecuador. This change of name affects the

following specimens previously reported as *Uredo Cherimoliae*: Chardon, Toro & Alamo 165, 313; Sydow 307.

PHAKOPSORA CROTALARIAE (Diet.) Arth. Bull. Torrey Club 44: 509. 1917.

On *Crotalaria anagyroides* H.B.K. Forests at Los Venados, above Caracas, Dist. Federal, July 8, 1938, C. E. Chardon 2702; Petare a Santa Lucia, Est. Miranda, April 13, 1939, Whetzel & Müller 3078.

Previously known only from Brazil.

PUCCINIA DEFORMATA Berk. & Curt.; Berk. Jour. Linn. Soc. 10: 357. 1869.

On *Olyra latifolia* L. Hacienda Lucinda, Urama, Est. Carabobo, April 2, 1939, Chardon, Whetzel & Müller 3283.

Originally from Cuba, this interesting species is known also from Jamaica, Puerto Rico, Nicaragua and Trinidad.

PUCCINIA FALLAX Arth.; Mains, Carnegie Inst. Wash. No. 461: 103. 1935.

*Puccinia fallaciosa* Arth. Mycologia 9: 84. 1917. Not *P. fallaciosa* Thüm.

On *Palicourea petiolaris* H.B.K. Road Petare a Santa Lucia, Est. Miranda, April 13, 1939, Whetzel & Müller 3397.

Heretofore reported from Puerto Rico and the Dominican Republic.

PUCCINIA INVAGINATA Arth. & Johnston, Mem. Torrey Club 17: 146. 1918.

On *Gouania polygama* (Jacq.) Urban. Jaguará, Caracas, Dist. Federal, Feb. 15, 1939, F. Tamayo 3075; Tucupe, near Caracas, Dist. Federal, Feb. 28, 1939, Whetzel & Müller 2849.

This rust is known from the West Indies, Guatemala, and Brazil. Both of these specimens have well developed telia.

PUCCINIA RUBRICANS Holway, Jour. Myc. 10: 165. 1904.

On *Banisteria cornifolia* (Kunth) Spreng. Hacienda Lucinda, Urama, Est. Carabobo, April 3, 1939, Chardon, Whetzel & Müller 3312.

Our specimen has only secondary uredinia. There are known in the life cycle pycnia, primary and secondary uredinia, and telia. The secondary uredospores have very thick walls (4-7  $\mu$ ) which show a more or less colorless outer layer. The spines are large, sparse, and sharp. The species was originally described from Brazil and has been reported from southwestern Mexico.

*PUCCINIA UNILATERALIS* (Arth.) Cummins, Bull. Torrey Club 67: 67. 1940.

On *Geranium velutinum* Turcz. Paramo de la Negra, Est. Tachira, Nov. 13, 1939, *Barrus & Müller 3596*.

An interesting species. Our specimen has the typical uredospores with the reniform shape and one pore on the concave side. It has been reported from Mexico, Colombia, and Ecuador.

\**Puccinia venezuelana* (Kern, Thurston & Whetzel) comb. nov.

*Uredo venezuelana* Kern, Thurston & Whetzel, Monog. Univ. Puerto Rico B. 2: 297. 1934.

In the account of the Uredinales in "Mycological Explorations of Venezuela" (l.c.) *Uredo venezuelana* was described as a new species on *Euphorbia crotonifolia* from La Mesa, Est. Trujillo.

We now have a collection on *Euphorbia caracasana* Muell. from Quebrada de Duri, Est. Trujillo, collected Nov. 11, 1939, by *Barrus & Müller 3607*, which has both uredinial and telial stages. The uredospores of this collection are so similar to those of the type of *Uredo venezuelana* there can be no doubt that they belong here. In the original description there is no statement that the wall of the uredospores consists of two layers. In both collections, however, there are some spores in which this is evident. The pores were said to be apparently 8, in two transverse zones equidistant from the equator. It should be added that they are sometimes so irregular as to appear scattered but there is a tendency toward the zonal arrangement.

A description of the telial stage follows:

Telia amphigenous, similar to uredinia in size and distribution, early naked, dark chocolate-brown; teliospores ellipsoid or oblong-ellipsoid, 21-26  $\times$  58-71  $\mu$ , rostriform at apex, rounded below, not or only slightly constricted at the septum; wall dark chestnut-

brown, 3.5–4  $\mu$  thick, with a golden-brown rostriform umbo, 16–19  $\mu$ , closely and finely verrucose; pedicel colorless below, often golden-brown and enlarged next to spore, usually 7–9  $\mu$  in diam., sometimes wider at base, about once length of spore.

It is interesting to note that this species has several characteristics in common with other species on *Euphorbia* (*Aklema*) such as *Puccinia Euphorbiae longipes* Sydow, *Puccinia velata* (Ellis & Ev.) Arth., and *Puccinia festata* Jacks. & Holw. In all of these the teliospores are rostriform at the apex, the wall is chestnut-brown and verrucose, and the pedicels are colorless except next to the spore where they are tinted and somewhat enlarged. There are differences, however, in size of both teliospores and uredospores, in the presence or absence of bulbous swellings at the bases of the teliospore pedicels, and other combinations of characters, which make all of them valid species.

***Puccinia Waltheriae* sp. nov.**

Teleutosoris hypophyllis vel cauliculis, sparsis vel gregibus 2–3 mm. diam. in maculis decoloratis insidentibus, rotundatis vel ovatis, 0.1–0.5 mm. diam., pulvinatis, compactis, mox nudis, primum pallide cinnamomeo-brunneis, dein germinando cinerascens; epidermide rupta non visibilis; teleutosporis ellipsoideis, 16–23  $\times$  51–64  $\mu$ , supra attenuatis et infra rotundatis, non vel leniter ad septum constrictis; tunica pallide aurato-brunnea, 2–2.5  $\mu$  cr., supra incrassata ad 6–8  $\mu$ , levi; pedicello hyalino, 6–8  $\mu$  lato, 65–112  $\mu$  longo.

On *Waltheria americana* L. La Guaira-Caracas road, Dist. Federal, March 3, 1939, Müller & Whetzel 2910.

This is a microcyclic species. Rusts are not at all common on the family Sterculiaceae. There is a microcyclic form on species of *Buettneria* in Central America but the teliospores are much smaller and the walls are thinner than in our species. Both the habit and the spores of our species are very like those of *Puccinia Malvacearum*. As that species inhabits the family Malvaceae we do not believe that the species on a genus of the Sterculiaceae can be identical even though similar.

RAVENELIA CAULICOLA Arth. N. Am. Flora 7: 143. 1907.

On *Cracca* (*Tephrosia*) sp. Near Los Teques, Est. Miranda, Feb. 5, 1935, W. A. Archer H261.

This species was originally described from the Bahama Islands.

It has also been reported from the Dominican Republic and Puerto Rico.

RAVENELIA CUBENSIS Arth. Mem. Torrey Club 17: 118. 1918.

On *Peirania Saeri* Britton & Rose. Quibor, Est. Lara, Nov. 24, 1939, *Barrus & Müller* 3593.

This species is known only in the uredinial stage and up to the present we find it known only from the type collection. Our specimen agrees perfectly with the type specimen as regards both habit and spore characters. There are no paraphyses, the spore walls are thicker above and the pores are 4, equatorial. We have had the opportunity to study the type through the aid of Dr. G. B. Cummins.

We are informed that the host here listed as *Peirania* is a segregate from the genus *Cassia* but that the transfer of this species to *Cassia* has never been made. We should add that *Cassia biflora* previously reported (Monog. Univ. Puerto Rico, Ser. 2: 292, 1934) as bearing *Ravenelia spinulosa* Diet. & Holw. also belongs to the segregate *Peirania*.

***Ravenelia mirandensis* sp. nov.**

Uredosoris plerumque hypophyllis, sparsis vel in greges parvos dispositis, rotundatis, 0.2-0.5 mm. diam., pallide cinnamomeo-brunneis; epidermide rupta visibile; paraphysibus nullis; uredosporis late ellipsoideis vel obovoideis,  $13-16 \times 18-21 \mu$ ; tunica flavida vel pallide aurato-brunnea,  $1 \mu$  cr., minute echinulata; poris 6-8, sparsis.

Teleutosoris amphigenis, sparsis vel in greges 0.2-0.8 mm. diam. dispositis, subepidermalibus, nitide atro-brunneis; epidermide rupta visibile; paraphysibus nullis; capitulis teleutosporarum convexis, obscure castaneo-brunneis,  $42-58 \mu$  diam., ex sporis 4-5 in omni directione compositis; sporis unicellularibus,  $16-19 \mu$  diam., papillis (4-6) subhyalinis  $3-5 \mu$  longis; tunica castaneo-brunnea,  $1.5 \mu$  cr., ad apicem usque  $3 \mu$ ; cystidiis eiusdem numeri atque cellulis marginalibus, ad capitulum adpressis; pedicello fragili, hyalino, deciduo.

On *Cassia Tora* L. Road Petare-Guarenas, Est. Miranda, March 15, 1939, *Whetzel & Müller* 2967.

The numerous spines on each teliospore and the appressed cysts differentiate this species from the others known on *Cassia* except *R. antiguana* Cummins. From the latter it differs in the lack of paraphyses, the smaller uredospores, and the smaller telial heads which are composed of fewer spores.

RAVENELIA PORTORICENSIS Arth. Bull. Torrey Club 31: 5. 1904.

On *Cassia emarginata* L. Road Caracas to Ocumare del Tuy, Est. Miranda, March 11, 1939, Whetzel & Müller 2979.

Previously reported from the West Indies, Cuba, Jamaica, Haiti, and the Dominican Republic.

\*UREDIO COCCOLOBAE P. Henn. Hedwigia 35: 353. 1896.

On *Triplaris* sp. Experiment Station Grounds, El Valle, Caracas, Dist. Federal, March 17, 1939, G. Vivas Berthier 2993.

The type of *U. Coccolobae* was from Brazil on *Coccoloba populifolia*. Arthur (Mycologia 9: 89, 1917, and N. Am. Flora 7: 609, 1924) took up this name for the West Indian rust on *Coccoloba uvifera*. As explained in the note under *Uredo uviferae* we think this was an incorrect use of the name. We believe the rust on *Coccoloba uvifera* in both the West Indies and Venezuela should be referred to *Uredo uviferae*.

The name *Uredo Coccolobae* used in the Venezuelan list (Monog. Univ. Puerto Rico B. 2: 293) remains in the list as we are now referring to it the rust on *Triplaris*. The genus *Triplaris* is botanically closely related to *Coccoloba*. The spores and paraphyses of our specimen on *Triplaris* agree so closely with *Uredo Coccolobae* that we do not hesitate to suggest this.

Both *Uredo Coccolobae* and *U. uviferae* will perhaps be found to belong to the genus *Phakopsora*. See also *Uredo uviferae*.

### **Uredo Combreti** sp. nov.

Uredosoris plerumque hypophyllis, sparsis vel in greges parvos dispositis, rotundatis, parvis, 0.1–0.2 mm. diam., mox nudis, pulverulentis, obscure cinnamomeo-brunneis; epidermide rupta inconspicua; uredosporis ellipsoideis, obovoideis, vel reniformibus, saepe irregularibus vel angularibus, 18–23 × 26–35  $\mu$ ; tunica flavida vel cinnomomeo-brunnea, tenui, 1–1.5  $\mu$ , validis echinulatis moderate distributis; poris obscuris.

On *Combretum fruticosum* (Loefl.) Stuntz. Road beyond Ortiz, entrance to Llanos, April 7, 1939, Whetzel, Müller & Chardon 3354.

The host is a shrub of the family Combretaceae. Two species of *Uredo* (*U. longaensis* P. Henn. Bot. Ergeb. Kun.-Sam.-Exped. 159, 1903; *U. terminaliae* P. Henn. Hedwigia 34: 321, 1895) have been described on this family—one from Brazil and one from



Africa. Our species does not agree with either of these in spore characters.

UREDIO CYATHULAE Mayor, Mem. Soc. Neuch. Sci. Nat. 5: 584. 1913.

On *Cyathula achyranthoides* (H.B.K.) Moq. Rancho Grande, road Maracay a Ocumare de la Costa, Est. Aragua, March 28, 1939, Chardon & Whetzel 3186.

Originally described from Colombia this species has been reported also from Panama (N. Am. Flora 7: 609-610, 1924). It has been rarely collected.

UREDIO FICINA Juel, Bih. Sv. Vet.-Akad. Handl. 23 (3)<sup>10</sup>: 25. 1897.

On *Ficus* sp. Saltanejas, Est. Miranda, Nov. 19, 1940, A. S. Müller 3938; Caracas, Dist. Federal, Feb. 18, 1939, F. Tamayo 2392, March 12, 1939, J. Camero-Zamora 2988; San Antonia de los Altos, Est. Miranda, Dec. 8, 1939, Barrus & Müller 3745; Barrancas, Jan. 10, 1940, F. Tamayo 3790.

Sydow reported *Physopella ficina* on *Ficus turbinata* from Venezuela in 1930 (Ann. Myc. 38: 50). In the Kern, Whetzel, and Thurston paper (Monog. Univ. Puerto Rico B. 2: 266, 1934) the Sydow specimen was listed as *Cerotelium Fici* (Cast.) Arth.; we are now agreed that was an error. Subsequent studies lead us to the conclusion that there are two species on *Ficus*. Cummins reached the same conclusion (see Bull. Torrey Club 70: 79, 1943). *Cerotelium Fici* is retained as the name for the rust on the common fig (*Ficus carica*) which has deeply lobed deciduous leaves (Chardon & Toro 636; Chardon 1160; L. Martorell 1577; P. Gonzales 1578). *Uredo ficina* is taken up as the name for the other species. The latter appears to be on those species of *Ficus* which have entire or toothed leaves which are not deciduous. *Uredo ficina* has larger, more strongly echinulate spores. Arthur (N. Am. Flora 7: 103, 1907) kept these two species separate but united them later (N. Am. Flora 7: 697, 1925).

\*UREDIO MACULANS Pat. & Gaill. Bull. Soc. Myc. Fr. 4: 98. 1888.

On *Alternanthera lanceolata* (Benth.) Standl. El Valle, Caracas, Dist. Federal, Nov. 27, 1939, A. S. Müller 3538.



This is one of the first rusts reported from Venezuela. In the original description the type locality was Caracas and the host was given merely as *Amaranthaceae*. Our specimen is from the type locality and the spores agree so well with the description that we have no doubt about our specimen belonging here. We believe this to be the second collection of the species from Venezuela.

Jackson (*Mycologia* 19: 57-58, 1927) reports *Puccinia Mogi-phanis* (Juel.) Arth. from Brazil, Bolivia, and Ecuador on several species of *Alternanthera* and on *Achyranthes* sp. The uredospores of this species are larger, thicker-walled, and more coarsely verrucose. We believe this species to be quite distinct from *Uredo maculans*.

Arthur reports *Uredo maculans* from Costa Rica and Panama (*N. Am. Flora* 7: 610, 1924).

***Uredo Monochaeti* sp. nov.**

*Uredosoris hypophyllis*, sparsis vel in maculis decoloratis aggregatis, rotundatis, 0.1-0.4 mm. diam., pallide cinnamomeo-brunneis, pulverulentis; epidermide rupta visibile; uredosporis late obovoideis, uno latere plerumque applanato vel concavo,  $16-21 \times 23-29 \mu$ ; tunica pallide cinnamomeo-brunnea,  $1-1.5 \mu$  cr., minute crebreque verrucoso-echinulata; poris 2, super-aequatorialibus, plus minusve obscuris.

On *Monochaetum hirtum* (Karst.) Triana. Caracas a Colonia Tovar, Dist. Federal, March 17, 1939, Whetzel & Müller 3001.

There are two rusts on the family Melastomaceae, one species of *Puccinia* and one of *Puccinosira*. Neither of these has a uredo stage. We have found nothing with which to compare our specimen.

UREDIO UVIFERAE Sydow, Monog. Ured. 4: 497. 1924.

On *Coccoloba uvifera* (L.) Jacq. El Valle, Caracas, Dist. Federal, Nov. 27, 1940, *J. Camera Zamora* 3945.

We have restudied also the specimen Chardon, Toro & Alamo 283 on *Coccolobis uvifera* and believe that it was erroneously reported as *Uredo Coccolobae* P. Henn. (*Monog. Univ. Puerto Rico B.* 2: 293. 1934). Sydow described the rust on *C. uvifera* from Puerto Rico and Cuba as *Uredo uviferae* and called attention to the fact that the spores are larger and thicker walled than

in *U. Coccolobae*—the measurements are  $19-27 \times 29-42 \mu$ , wall  $1.5-2 \mu$ , as against  $14-18 \times 18-28 \mu$ , wall about  $1 \mu$ . So far as we know this is the first time this name has been used for South American specimens. See also *Uredo Coccolobae*.

UROMYCES COLOGANIAE Arth. Bot. Gaz. 39: 387. 1905.

On *Teramnus uncinatus* (L.) Sw. Road Petare to Santa Lucia, Est. Miranda, April 13, 1939, Whetzel & Müller 3402. Heretofore known from Mexico, Guatemala, and Puerto Rico.

UROMYCES DOLICHOSPORUS Diet. & Holw.; Holway, Bot. Gaz. 31: 327. 1901.

On *Tournefortia volubilis* L. Mamo, Dist. Federal, April 9, 1939, F. Tamayo 3082.

Known also from Costa Rica, Mexico, Cuba, Puerto Rico, and Brazil.

UROMYCES HELLERIANUS Arth. Bull. Torrey Club 31: 2. 1904.

On *Melothria* aff. *guadalupensis* (Spreng.) Cogn. Central Lucinda, Est. Carabobo, April 13, 1938, C. E. Chardon 2603.

Known also from Central America, the West Indies, and Ecuador.

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## NOTES ON TAXONOMY AND NOMENCLATURE OF THE POLYPORES

ROLF SINGER

Together with A. A. Bondarzew, the writer has tried to work out a more natural classification of the Polyporaceae which was to be published in 1941 (*Sovietskaya Botanika*, June 1941; however, copies of this and other recent issues of this periodical were not available in Cambridge). The essential part of this system of classification has been published in *Annales Mycologici* **39**: 43-65, 1941, shortly before the war started. Under these circumstances, few mycologists in this Hemisphere have been able to compare our scheme with older classifications. Incidentally, in this country, a parallel effort—though dealing mostly with questions of nomenclature—has been made by Wm. Bridge Cooke (*A nomenclatorial survey of the genera of pore fungi*, *Lloydia* **3**: 81-104, June 1940). Also D. P. Rogers published some important observations on the Corticiineae as well as an essay on the nomenclatorial status of S. F. Gray in mycology (Rogers, Donald P., *Relative dates of S. F. Gray's Natural Arrangement and Fries' Systema*, *Mycologia* **33**: 568-570, 1941), showing that Gray's book is to be considered post-Friesian. Both papers are bound to influence the nomenclature used in our own publications, but appeared too late to come to our attention in time.

It seems, therefore, advisable to give a short extract of our classification in which certain corrections have been made as far as they have become necessary on the base of the data published by Cooke and Rogers.

A short Latin description will be added to the name of each genus proposed, as far as it is new; for the rest of the genera, the type species only is indicated. The numbers in parentheses after a generic name refer to notes concerning this particular genus, given under the headline "Diagnoses and Observations."

The classification is based on the following subfamilies and genera.

A. Subfamily POROIDEAE: **Fibuloporia** B.-S.<sup>1</sup> (1); **Xylodon** Karst. non Ehrenb., type *X. paradoxus* (Schrad.) Karst.; **Podoporia** Karst. *sensu* Donk, type *P. sanguinolenta* (Alb. & Schw.) Hoehn.; **Ceraporus** Donk, type *C. viridans* (Berk. & Br.) Donk; **Amyloporia** B.-S. (2); **Aporpium** B.-S. (3); **Chaetoporellus** B.-S. (4); **Chaetoporus** Karst., type *C. euporus* (Karst.) B.-S.

B. Subfamily TYROMYCETOIDEAE: **Laetiporus** Murr., type *L. sulphureus* (Bull.) B.-S.; **Tyromyces** Karst., type *T. chioneus* (Fr. *sensu* Karst.) Karst. **Amylocystis** B.-S. (5); **Bjerkandera** Karst., type *B. adusta* (Willd.) Karst.; **Spongipellis** Pat., type *S. spumeus* (Sow.) Pat.; **Gloeoporus** Mont., type *G. conchoides* Mont.; **Hapalopilus** Karst., type *H. nidulans* (Fr.) Karst.

C. Subfamily FOMITOIDEAE: **Cryptoporus** (Peck) Hubbard, type *C. volvatus* (Peck) Shear; **Piptoporus** Karst. em. Pilat, type *P. betulinus* (Bull.) Karst.; **Ischnoderma** Karst., type *I. resinolum* (Fr.) Karst.; **Osmoporus** gen. nov. (6); **Pelloporus** Quél. *sensu* stricto, type *P. corrugis* (Fr.) B.-S.; **Fomes** (Fr.) Kickx *sensu* stricto, type *F. fomentarius* (L.) Kickx; **Fomitopsis** Karst., type *F. pinicola* (Schw.) Karst.; **Phaeolus** Pat., type *P. Schweinitzii* (Fr.) Pat.; **Inonotus** Karst., *I. cuticularis* (Bull.) Karst.; **Phellinus** Quél., type *P. igniarius* (L.) Quél.; **Leucophellinus** B.-S. (7); **Cyclomyces** Kunze & Fr., type *C. fuscus* Kunze & Fr.; **Cycloporus** (Pat.) Murr., type *C. Greenii* (Berk.) Murr.; **Coltricia** S. F. Gray (8); **Polystictus** Fr. (8); **Ganoderma** Karst. em. Pat., type *G. lucidum* (Leyss.) Karst.

D. Subfamily POLYPOROIDEAE: **Polyporus** Mich. *sensu* Donk, type *P. tuberaster* (Jacq.) Fr.; **Asterochaete** (Pat.) B.-S. type *A. megalopora* (Mont.) B.-S.

E. Subfamily CORIOLOIDEAE: **Pycnoporus** Karst., type *P. cinabarinus* (Jacq.) Karst.; **Cerrena** Mich. ex S. F. Gray (9); **Coriolus** Quél., type *C. versicolor* (L.) Quél.; **Coriolellus** Murr. type *C. sepium* (Berk.) Murr.; **Poronidulus** Murr., type *P. conchifer* (Schwein.) Murr.; **Trametes** Fr., type *T. suaveolens* Fr.; **Pseudotrametes** B.-S. (10); **Haploporus** B.-S. (11); **Hexagona** Fr., type *H. nitida* Mont.; **Antrodia** Karst., type *A. mollis* (Sommerf.) Karst.; **Funalia** Pat., type *F. mons-veneris* (Jungh.) Pat.; **Coriolopsis** Murr., type *C. occidentalis* (Klotzsch) Murr.;

<sup>1</sup> The abbreviation "B.-S." stands for A. S. Bondarzew and Rolf Singer.

**Baeostratoporus** B.-S. (12); **Abortiporus** Murr. (13); **Oxyporus** (Bourd. & Galz.) Donk em. B.-S., type *O. populinus* (Fr.) Donk; **Irpex** Fr. *sensu stricto*, type *I. lacteus* Fr.; **Hirschioporus** Donk em. B.-S., type *H. abietinus* (Dicks.) Donk; **Daedalea** Pers. ex Gray, type *D. quercina* (L.) Fr.; **Daedaleopsis** Schroet., type *D. confragosa* (Bolt.) Schroet.; **Lenzites** Fr. *sensu* Karst., type *L. betulina* (L.) Fr.; **Gloeophyllum** Karst., type *G. sepiarium* (Wulf.) Karst.

In addition to this, pore bearing fungi are transferred to some other suborders but Polyporineae. Thus, the genus **Boletopsis** Fayod is considered as belonging to the suborder Phylacteriineae, fam. Boletopsidaceae; **Scutiger** Paulet ex Murr. (14), **Bondarzewia** Sing. based on *Polyporus montanus* Quel., and **Polyphilus** Karst. (15) to the Clavariineae (Scutigeraceae); **Fistulina** Fr., based on *F. hepatica* (Huds.) Fr. to the Cyphellineae (Fistulinaceae), and **Porothelium** Fr., based on *P. fimbriatum* (Pers.) Fr. to the same suborder and family; **Sistotrema** Pers. em. B.-S., D. P. Rogers, based on *S. confluens* Pers., **Phlebiella** Karst. (16), **Byssocorticium** B.-S. (17), and **Vararia** Karst. (18) to the Corticiineae (Corticaceae); **Serpula** Pers. ex S. F. Gray (19), **Merulius** Hall. em. Fr. *sensu* Pat., based on *M. tremellosus* (Schrad.) Fr., and **Merulioporia** B.-S. (20) to Corticiineae, family Meruliaceae. In addition, all the genera belonging to Boletaceae or Strobilomycetaceae are, of course, excluded from the Polyporaceae.

#### DIAGNOSES AND OBSERVATIONS

(1) *Fibuloporia* B.-S. Poriae acystidiatae, fibuligerae, aequiporae, molliculae, sporis ovoideis, ellipsoideis v. subglobosis. Species typica: *F. mollusca* (Pers.) B.-S.

(2) *Amyloporia* B.-S. Poriae acystidiatae, amyloideae, sporis cylindricis v. allantoides. Species typica: *A. calcea* (Fr.) B.-S.

(3) *Aporpium* B.-S. Poriae acystidiatae, haud fibuligerae, inamyloideae, sporis cylindricis v. allantoides. Species typica: *A. canescens* (Karst.) B.-S.

(4) *Chaetoporellus* B.-S. Poriae cystidiatae v. hyphis excreticibus instructae, molles v. fragiles, fibuligerae. Species typica: *C. latitans* (Bourd. & Galz.) B.-S.

(5) *Amylocystis* B.-S. "Polypori" pileati, cystidiis amyloideis. Species typica: *A. lapponicus* (Rom.) B.-S.

(6) *Osmoporus* Sing. gen. nov. "Polypori" astipitati, intus brunnei, margine obtusi v. subacuti, indistincte crustati, poris crasso-parietalibus latiusculisque, interdum spurie stratosi, odorati, ad ligna coniferarum crescentes. Species typica: *O. odoratus* (Wulf.) comb. nov. Species alia: *O. caucasicus* (Bres.) comb. nov.

We had tried to revive Humboldt's genus *Ceratophora* which, however, is based on abnormal forms and, therefore, must be excluded.

(7) *Leucophellinus* B.-S. "Polypori" astipitati, poris trametoideis v. irpecoideis haud stratosi nec setosi, intus albi v. flavidi, sporis bi-tunicatis, hyalinis. Species typica: *L. irpicoides* (Bondarzew apud Pilát) B.-S.

(8) *Coltricia* S. F. Gray.—This name has to be substituted for *Polystictus* Fr. Gray's genus is valid and has priority over Fries' genus. The determination of the type species of this latter (*Polystictus perennis*) by Ames was illegal as Fries did not mention *P. perennis* in his "Novae Symbolae . . ." (1851). The first species mentioned and at the same time the best known of the species mentioned in "Novae Symbolae . . ." is *P. tomentosus* Fr. ex Fr., and it seems to be best to recognize this species as the type of the genus *Polystictus*. In doing so, we can use *Polystictus* sensu stricto for the species now composing the section *Onnia* of *Polystictus* which will have to be separated generically from *Coltricia* sooner or later. In this case, no new combinations would be required.

(9) *Cerrena* Mich. ex S. F. Gray.—This genus has to replace the later synonym *Phyllodontia* Karst., both being based on the same species, *Cerrena unicolor* (Bull.) Murr., which is the same as *Phyllodontia Magnusii* Karst.

(10) *Pseudotrampetes* B.-S. "Polypori" trametoidei, vix umquam fibuligeri, sporis minutis, cylindricis, poris radialiter elongatis, intus albi, crassi, inodori. Species typica: *P. gibbosa* (Pers.) B.-S.

(11) *Haploporus* B.-S. "Polypori" trametoidei, vix umquam fibuligeri, sporis minutis, ovoideis, poris teretis, integris, intus albi, odorati v. inodori. Species typica: *H. odoratus* (Fr.) B.-S.

(12) *Baeostratoporus* B.-S. "Polypori" trametoideo-fomitei, astipitati, hyphis irregularibus, dense intricatis, intus flavi pallidive, demum brunnescentes, tenuissime stratosi. Species typica: *B. Braunii* (Rab.) B.-S.

(13) *Abortiporus* Murr.—This genus has to replace *Heteroporus* Láz., and the type species becomes *A. distortus* (Schwein.) Murr. Other species: *A. biennis* (Bull.) comb. nov., *A. borealis* (Wahl.) comb. nov., *A. humilis* (Peck) comb. nov.

(14) *Scutigera* Paulet ex Murr.—Wm. Bridge Cooke proposes the generic name *Albatrellus* Mich. ex Gray for this group. We prefer *Albatrellus fuligineus* (Pers.) S. F. Gray as the type species

of the genus, rather than *Albatrellus albidus* (Pers.) S. F. Gray, because thus we avoid the use of a genus that is entirely heterogenous, consisting of two species so little related that they have been classified in different families in our scheme of the pore fungi. Besides, we would avoid unnecessary new combinations for fungi now well known as *Scutiger* species. The type species of *Scutiger* remains to be *S. tuberosus* respectively *S. pes-caprae* (Pers.) B.-S. *Albatrellus* becomes a synonym of *Polyporus*.

(15) *Polypilus* Karst. We prefer *Grifola platypora* as the type species of Gray's genus *Grifola* because this avoids the use of a species as type species that is the only representative of the genus *Polypilus* within *Grifola*, while all the rest of the species listed by Gray belong to widely different genera. The largest recognizable element within *Grifola* consists of species now classified as *Polyporus* (*squamosus*, *varius*). Therefore, we maintain *Polypilus* Karst. with the type species *P. ramosissimus* (Dicks.) Karst., and put *Grifola* (p.p.) in synonymy with *Polyporus* Mich. ex Fr. *sensu* Donk.

(16) *Phlebiella* Karst. (fide D. P. Rogers, The Genera *Trechispora* and *Galsinia* (Thelephoraceae), to be discussed in Mycologia 36 (1), 1944) is the correct generic name for the species referred to *Trechispora* Bond. & Sing. non Karst. (*T. candidissima* (Schwein.) B.-S., *T. trachyspora* (Bourd. & Galz.) B.-S., etc.), since the type species of *Trechispora* Karst. belongs to the neighborhood of *Sistotrema* as defined by Bondarzew and Singer, and D. P. Rogers. Type species of *Phlebiella* is: *Phlebia vaga* Fr.

(17) *Vararia* Karst. (= *Asterostromella* Hoehn. & Litsch.).—See R. Singer, Type studies on Basidiomycetes II, Mycologia 35: 160, 1943.

(18) *Byssocorticium* B.-S. Poriae, Corticia, a *Nothotrechisporis* ampullis absentibus, a generibus Poroidearum consistentia byssoidea recedentia. Species typica: *B. atrovirens* (Fr.) B.-S.

(19) *Serpula* Pers. ex S. F. Gray.—Based on *Merulius lacrymans*, this genus evidently has priority over *Gyrophana* Pat.

(20) *Merulioporia* B.-S. 1941, based on *M. taxicola* (Pers.) B. & S. Murrill's genus of the same name (Mycologia 34: 596, 1942, spelled *Meruliporia*), based not on *M. taxicola*, but on *M. incrassata* (Berk. & Curt.) Murr., is different.



## THE GENERA TRECHISPORA AND GALZINIA (THELEPHORACEAE)<sup>1</sup>

DONALD P. ROGERS

(WITH 14 FIGURES)

The genus *Trechispora* is made up of resupinate hymenomycetes possessing urniform basidia. That peculiar type of basidial development and structure best referred to as the urnigera type was first made the basis of taxonomic segregation in 1911, when Bourdot & Galzin (Bull. Soc. Myc. Fr. 27: 243) described the "Groupe *Urnigera*" within the genus *Corticium*, and assigned to it the species *C. octosporum*, *C. coronilla*, *C. diademiferum*, and *Odontia Brinkmanni* Bonorden (Hedwigia 15: 76. 1876) and Höhnelt & Litschauer (Ann. Myc. 4: 291. 1906) had already described species with the many-spored, coronate basidia and the compact, proliferative basidial clusters characteristic of the group in question, but had failed to mention the distinguishing developmental stages and final form of the basidia. Bourdot & Galzin subsequently recognized *Urnigera* sections in other genera of the lower hymenomycetes; that they did not combine these into a single genus is probably to be explained by their declared practice (Hym. Fr. [i]. [1928]) of following the classification of Patouillard. In 1934 I discussed the desirability of bringing together all the urnigera fungi (Univ. Iowa St. N. H. 16: 176), and in 1935, after correspondence with Dr. M. A. Donk and at his suggestion, adopted the name *Sistotrema* for both resupinate and pileate members of the group (Univ. Iowa St. Nat. Hist. 17: 19). It now appears more convenient to allow a separation between the pileate genus *Sistotrema* and the resupinate species; for the latter the name *Trechispora*, apparently the earliest available, has been adopted. Although in 1935 I possessed a considerable quantity of material of these fungi, the distinctness of certain of the accepted species remained in some doubt, and others I could

<sup>1</sup> Contribution from the Department of Botany, Brown University.



not properly attempt to define without examination of their type specimens. Accordingly, only two species were then treated. Since that time, from study of types and of a much larger series of specimens it has become possible to distinguish, or with some assurance to reduce to synonymy, all described species of urnigera basidiomycetes. Three such fungi have already been assigned to *Trechispora* by Rogers & Jackson (Farlowia 1: 282, 288, 328, 1943), and these and others are herein described.

Since the character by which species of *Trechispora* may be recognized among the heterogeneity and confusion of the lower hymenomycetes is a peculiar basidial morphology, the segregation of this genus and *Sistotrema* is only a lesser continuation of the evaluation of basidial types commenced by the Tulasnes and Patouillard. *Trechispora* possesses (although probably in slighter degree) the same sort of autonomy which may be claimed for *Calocera*, *Sebacina*, *Helicobasidium*, or *Tulasnella*, none of which could be separated from its parent genus except by its basidia. Once the characters of a number of organisms become accurately known, the classification of these organisms amounts to neither more nor less than the embodiment of a hypothesis concerning their phyletic relations. For the fungi here brought together in *Trechispora* mycologists have adopted one or the other of two such hypotheses. According to the first, which is implicit in more conservative classifications, hymenial configuration is a reliable indication of kinship. That is, all hymenomycetes with a smooth hymenium (Thelephoraceae) are descended from one common ancestral form or group; all those with granulose-to-spinose hymenium (Hydnaceae) are descended from another; and all those with reticulate-to-poroid hymenium (Polyporaceae) have a third. On this hypothesis such groups of characters as those which mark the urnigera forms (or, for a second example, Patouillard's Phylacteriaceae) arose independently within the several families, and the micromorphologic resemblances between smooth and hydroid, or smooth and polyporoid, urnigera species are the result of accidental convergence. According to the second hypothesis, which underlies the classification presented in this paper, the urnigera basidium and the other characters regularly associated with it are a reliable indication of kinship, and the

variations in hymenial configuration (such as those which have served to separate *Corticium coronilla* from *Grandinia Brinkmanni*) are comparatively trivial and recent variations in a single original type. On this hypothesis it is the urnigera members of the Thelephoraceae, Hydnaceae, and Polyporaceae that are descended from one common ancestral form or group, and variation in hymenial configuration that has brought about accidental convergence. On the first hypothesis *Corticium coronilla*, *C. cremoricolor*, and *Tomentella* are closer kin to each other than is the first to *Grandinia Brinkmanni* or *Poria onusta*, the second to *Radulum membranaceum*, and the third to *Caldesiella*; on the second the opposite is true. These two points of view are presented in order to make clear the basis for the present association of species.

Unless the disadvantages of change are generally held to be greater than the disadvantages of an unnatural classification, the older families of the Agaricales will some day have to be discarded. Until that time, the finding of places for genera like the present one will be difficult. Not because *Trechispora* has any but the remotest kinship to *Thelephora*, but because those urnigera species with smooth hymenium are probably the primitive ones, and are in the majority, *Trechispora* is temporarily assigned, in the artificial taxonomy which must be tolerated until it can be superseded, to a place in the Thelephoraceae.

*Galzinia* may not be closely related to *Trechispora*. But because its basidia consist of a basal vesicle and an apical expanded sporiferous portion, connected by a neck of variable length, specimens of *Galzinia* might at times be sought in *Trechispora*, and the two genera are accordingly included in the one paper.

I am indebted to the Oregon General Research Council for grants in aid of mycological collection and research at Oregon State College; to Dr. D. V. Baxter of Michigan, Mrs. Harvey Bingham of Western Reserve, Dr. J. N. Couch of North Carolina, Dr. G. D. Darker of the Missouri Botanical Garden, Dr. B. O. Dodge of the New York Botanical Garden, Professor F. O. Grover of Oberlin, the late Professor V. Litschauer of Innsbruck, Dr. G. W. Martin of Iowa, Dr. F. J. Seaver of the New York Botanical Garden, Dr. E. V. Seeler, Jr., of Harvard, Mr. J. A.

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TRECHISPORA Karst. Hedwigia **29**: 147. 1890; Bidr. Känned. Finl. Nat. Folk **54**: 178. 1893; Bond. & Sing. Ann. Myc. **39**: 48. 1941, quantum ad typum, descr. et spec. caeteris excl.; Rogers & Jackson, Farlowia **1**: 328. 1943.

*Corticium* [sect.] *Urnigera* Bourd. & Galz. Bull. Soc. Myc. Fr. **27**: 243. 1911; Hym. Fr. 235. [1928]; Donk, Nederl. Mycol. Ver. Med. **18-20**: 137. 1931.

*Heptasporium* Bref. Unters. **15**: 111. 1912.

*Gloeocystidium* [sect.] *Urnigera* Bourd. & Galz. Hym. Fr. 264. [1928].

*Poria* sect. *Urnigerae* Donk, Nederl. Mycol. Ver. Med. **22**: 220. 1933.

*Sistotrema sensu* Donk in litt. ex Rogers, Univ. Iowa St. N. H. **17**: 19. 1935, typo excl.; Bond. & Sing. Ann. Myc. **39**: 47. 1941, tantundem.

Type: *T. onusta* Karst.

Fructification resupinate, even (corticoid), granulose (granulinioid), spinulose (hydroid), or porose (porioid), in texture pruinose, arachnoid, or fragile-membranous; hyphae with strong clamps throughout, often ampullate at the septa, short-celled and abundantly branched except for the more regular basal strands; basidia mostly arising in compact clusters through proliferation of the subtending clamps, at first subglobose or ellipsoid, developing a narrow tubular prolongation at whose summit are borne 5-8, or more rarely only 4, peripheral sterigmata; spores mostly even and thin-walled, rarely angular or slightly thick-walled; gloeocystidia present in some species.

*Trechispora* is chiefly characterized by the small, distinctly urniform basidia with a long-persistent subglobose or ellipsoid

early stage in development. Most species show also five to eight sterigmata; but with them must be included species similar in other respects but having only four. All those studied have the immature basidia of various ages borne in clusters, as a result of their development through clamp-proliferation (cf. *Mycologia* 28: 347-362. 1936); but this constant character is probably not an essential one, and in some species other basidia are more loosely arranged at various levels on the fertile hypha. From *Sistotrema sensu strictiore* *Trechispora* differs in the resupinate basidiocarps; from *Pellicularia*, *Corticium calceum sensu* Bourd. & Galz., *C. subinvisible*, and certain other corticioid fungi having more than four sterigmata, by the form of the basidium and the two distinct phases in its development.

In 1935 I published (l.c.) an emendation of *Sistotrema* Pers. (Roem. N. Mag. Bot. 108. 1794; Tent. Disp. Meth. Fung. 28. 1797; Syn. Meth. Fung. 550. 1801; Myc. Eur. 2: 191. 1825) ex Fr. (Syst. Myc. 1: 426. 1821) to include the fungi here assigned to *Trechispora*, with which *Sistotrema confluens* agrees in basidial morphology. There was, and still is, some doubt concerning the type species of Persoon's genus. In his original diagnosis (l.c.) he wrote "pileo suberoso," a phrase more applicable to his second species, *S. cinereum* (= *Boletus unicolor* Bull.) than to the first, *S. confluens*, which Persoon later (Syn. Meth. Fung. 551. 1801) characterized by "pileo carnosio flexuoso." Nevertheless, *S. confluens* is retained by Persoon in all his later treatments, and is the only species included by Fries in 1821 (l.c.) and by certain other authors. Fries may then be considered to have established this, rather than the other species originally included in the genus, as the generic type. Fries sought to do even more; with his undeviating punctiliousness he ascribed the genus to himself (l.c.); but both genus and species are, as he indicated under the latter, Persoon's, and should be written "Pers. ex Fr."

In referring both resupinate and pileate species to *Sistotrema*, Donk and the writer were influenced not only by the essential identity of the basidia, but also by Bourdot's account (Hym. Fr. 437. [1928]) of replacement of resupinate fructifications by the stipitate ones of *S. confluens*. Such collections of that species

as have been examined give no evidence of any intergradation with resupinate basidiocarps, and it seems that the connection cannot be regarded as proved. Consequently resupinate forms may be susceptible of segregation from the pileate *Sistotrema*, and such segregation has been adopted by Rogers & Jackson (l.c.) and for the present discussion. The further subdivision of the resupinate group on the basis of basidiocarp morphology would, however, clearly cut across lines of affinity. Thus, as pointed out under the several species, *Trechispora onusta* (porioid) and *Grandinia raduloides* are scarcely distinguishable except by gross morphology, and possess in common a variation of the urnigera basidium present in no other species; similarly one portion of a fructification may possess the characteristics of *Grandinia Brinkmanni* and the remainder those of *Corticium coronilla*. Consequently all the resupinate species are treated not merely in the same series or subfamily, but in the same genus.

For this genus the name *Trechispora* Karst. clearly has priority. *Trechispora* is monotypic; the type specimen of *T. onusta* has been examined, and belongs here. The name is unfortunate, since neither the type nor most other species are "rough-spored"; but it is that rare thing among resupinates, a generic name whose application can be fixed beyond question. So much cannot be said for *Heptasporium* Bref., which in addition is a name almost as inept. Ineptness is not, however, the only possible objection to the name *Trechispora*. From a strictly etymological point of view, *Trechispora* is an orthographic variant of *Trachyspora* Fuckel 1861 of the Uredinales; the lexicon gives Τρηχυσ as "Ion. for Τραχυσ." Yet according to Art. 70(3) of the Rules, "in deciding whether two . . . slightly different names should be treated as distinct or as orthographical variants, the essential consideration is whether they may be confused with one another or not"; there seems no reason to anticipate confusion of these, differing as they do in two letters and in pronunciation, and especially since the genera to which they are applied belong to two different subclasses; and *Trechispora* and *Trachyspora* are no more mere orthographic variants than are *Urvillea* and *Durvillea*, expressly held by the Rules to be distinct. A more serious objection to the use of Karsten's name might be based on Bresadola's

conjecture (Ann. Myc. 6: 41. 1908) that "original specimens" consisted of not one fungus but two. Bresadola reported that such specimens "agree in [basidia, spores, and hyphae], but there is present in them a substratum, especially evident at the sides, dirty lilaceous in color, consisting of hyaline hyphae which bear subglobose, hyaline, aculeolate conidia  $4 \times 3-4 \mu$  in diameter. These [conidia] perhaps were taken for spores by Karsten when he said that the spores are echinulate—which indeed is false." Now the specimen of *T. onusta* in the Patouillard collection, bearing collection-data which permit the assumption that it is a part of the type, certainly has at the edge mycelium without clamps which does not belong to the basidiocarp. This mycelium, however, bears no conidia; and since it is all very slender, while the dimensions given by Karsten,  $2-7 \mu$ , correspond to those of the clamp-bearing hyphae of the basidiocarp, there seems no sufficient evidence that Karsten confused two fungi in writing his description. Furthermore, Bresadola's descriptions of the basidiospores as "very minutely asperulate or smooth," whereas they are quite smooth, and of the basidia as "subglobose . . . as in *Tulasnella*," attest the inaccuracy, or at least the incompleteness, of his own observations, and, in respect to the spores, seem to convict him also of Karsten's error in describing the outline. Bresadola does not, as a matter of fact, assert that *T. onusta* is a name based on two species erroneously taken to be one, and the portion of the type examined for that possibility affords no adequate basis for rejecting Karsten's genus and species as nomina confusa. Since the alternative to recognizing *Trechispora* is accepting *Heptasporium* and an unrecognizable type species, it seems imprudent to magnify these acknowledged difficulties.

The fungi of this genus are bewildering in their variability; in particular I have thus far been unable to find any natural cleavage within the *Corticium coronilla* complex. In the earlier discussion it was stated that "The specific limitations of some of these species are not well established and the distinctness of several [is] more than a little doubtful"; this was not to say, however, as an inadvertent misinterpretation of that paper has paraphrased it, that *C. diademiferum* and *C. niveo-cremeum* were



included under the name *Sistotrema coronilla*, a species that included nothing but *C. coronilla*.

Relying upon Karsten's account of the spores of *Trechispora*, Donk (Nederl. Myc. Ver. Med. 22: 221. 1933) listed that genus under *Poria* sect. *Subtiles* Bourd. & Galz. emend. Donk, a group limited by him to rough-spores species. In this Bondarzew & Singer (l.c.; cf. p. 73 of this paper) followed Donk; they used Karsten's genus for those resupinate hymenomycetes with asperulate spores and ampullate hyphae previously included in *Corticium* sect. *Humicola* Bourd. & Galz. and related groups within *Grandinia* and *Poria*. As shown, however, by the specimen here cited, and by Bourdot & Galzin's description of *T. onusta*, *Trechispora* is a genus rather of urnigera species, and another name must be used for the section *Humicola* and congeneric forms.<sup>2</sup>

<sup>2</sup> Five published generic names must be considered as possibly applicable to *Trechispora sensu* Bondarzew & Singer:

(1) *Merisma* Pers. Myc. Eur. 1: 155. 1822. This name is, however, antedated by *Merisma* Pers. ex Gray, Nat. Arr. Br. Pl. 1: 653. 1821, whose type must be selected from the two species *M. cristatum* (Pers. ex Fr.) Gray and *M. foetidum* Pers. ex Gray. Since the first of these species is probably the same as *Sebacina incrustans* (Pers. ex Fr.) Tul. (cf. Burt, Missouri Bot. Gard. Ann. 2: 752. 1915; Bourd. & Galz., Hym. Fr. 231. [1928].), to adopt it as the type would make necessary either discarding the generic name *Sebacina* Tul. or conserving *Sebacina*, [1871], against *Merisma*. Therefore *M. foetidum* is hereby designated as the lectotype of *Merisma* Pers. ex Gray. Since *M. foetidum* is probably the same as *Thelephora palmata* [Scop.] Fr., *Merisma* is in either case not available for *Corticium* sect. *Humicola* and related species. *Merisma* could be used here only by conservation of *Merisma* Pers., 1882, with the lectotype *M. fastidiosum* (Pers. ex Fr.) Pers., against *Merisma* Pers. ex Gray, 1821.

To avoid possible nomenclatorial complexities that might arise from the existence of *Thelephora* trib. *Merisma* [Pers.] Fr., Syst. Myc. 1: 432. 1821, *T. palmata* [Scop.] Fr. is hereby designated the lectotype of that Friesian tribe.

(2) *Athelia* Pers. Myc. Eur. 1: 83. 1822. Under the name *Athelia* its author assembled a most heterogeneous group of fungi, of which *A. strigosa*  $\beta$  *musciigena* is now known as *Peniophora byssoides*, *A. velutina* as *P. velutina*, *A. Typhae* as *Epishele Typhae*, *A. citrina* possibly as *Corticium bicolor*, and *A. sericea* as *Corticium sulphureum*; the remaining names may all represent lost species. Since the name *Athelia* is not at present maintained for any of its recognizable species, and seems never to have been typified, it is available for any genus which, like the one here under discussion, includes one of its species. The name *Athelia* means, however, "without papillae"; since the

(Footnote continued on page 78)

elevations on the hymenium of *A. sericea* (*Corticium sulphureum*) in some of its varied phases are sufficiently prominent to have caused Fries to assign it to the genus *Phlebia* (see the following discussion under *Phlebiella*), *A. sericea* may be regarded as atypical, and is consequently here rejected as a possible lectotype for *Athelia*. Since *A. sericea* seems to be the only *Humicola* form in its genus, *Athelia* then becomes unavailable for the fungi in question (*Trechispora sensu* Bond. & Sing.).

It would be possible at this time to fix the application of Persoon's generic name by the formal designation of a lectotype for *Athelia*. It seems advisable, however, to refrain from making such a decision until the actual need arises for a generic name for some other species of that group.

(3) *Cristella* Pat. Hym. d'Eur. 151. 1887; type, *C. cristata* ([Pers.] ex Fr.) Pat. This is certainly the preferable name for the genus under discussion; it has recently been used as such by Cooke (*Mycologia* 35: 288. 1943.). From Patouillard's figures (Tab. Anal. 2: 25. fig. 559. 1886; Essai. Taxon. 41. 1900.), descriptions, and specimens (two collections, in the Patouillard collections of the Farlow Herbarium), there can be no doubt of the fungus he had in mind in describing the genus: it was the form described by Bourdot & Galzin, Hym. Fr. 230, as *Corticium fastidiosum*. Since, however, the only possible generic type is *Thelephora cristata* [Pers.] Fr., which presumably is a *Sebacina*, *Cristella* must fall into synonymy with that genus. At least, that seems to be the meaning here of the type concept. It is also in accordance with the principle settled upon at the Amsterdam congress, for dealing with new binomials erroneously applied (cf. *Science* n. s. 83: 417. 1936, paragraph 6; *Zesde Int. Bot. Congr. Proc.* 1: 347-354. 1936.). That principle, stated in general terms, is that where a typonym (here *Thelephora cristata*) associated by an author with a new name (here *Cristella cristata*) is not properly applicable to the author's material and description (here *Corticium fastidiosum*), it is the typonym, rather than the misdetermined material, which determines the application of the new name. Now *Thelephora cristata* probably is the same as *Sebacina incrustans*. Ergo, *Cristella* = *Sebacina*.

(4) *Soppitiella* Mass. Br. Fung.-Fl. 1: 106. 1892, an ill defined and heterogeneous group of five species. Both the description and the species enumerated seem to include *Sebacina* and *Tomentella*, and perhaps also a *Humicola* form. One of the species is *S. fastidiosa* Mass., said to be the same as "*Thelephora fastidiosa* Berk.". Whether by his citation of Berkeley as the author of that species Massee intended to reflect doubt of the correctness of Berkeley's determinations cannot be determined from the context; if he intended to refer to *T. fastidiosa* [Pers.] Fr., a *Humicola* form, *Soppitiella* must be considered as a possible name for *Trechispora sensu* Bond. & Sing., even though *T. fastidiosa* is excluded by Massee's description. Massee segregated the genus from *Thelephora*, "from which it differs in being soft and subgelatinous when moist, and compact, not strigose pileus." In the absence of other motives for selecting a species as the type of a genus, it has been held desirable to choose that species which the author illustrated, as presumably the one best representing his intended concept. There seem to be no other allowable motives here, and *S. cristata* ([Pers.] ex Fr.) Mass. is therefore hereby designated as the lectotype of *Soppitiella*. That species is of course the same *Thelephora*



KEY TO THE SPECIES<sup>2</sup>

1. Basidiocarps pileate..... *Sistotrema confluens*.
1. Basidiocarps resupinate..... 2
  2. Basidiocarps alveolate (porioid), with delicate dissepiments separating angular pores..... 3
  2. Basidiocarps hydroid, with minute distinct spines..... 5
  2. Basidiocarps even (corticoid) or granulose (grandinioid)..... 6
3. Basidia with short, cylindric distal portion; spores subglobose or broadly ellipsoid, 5-7  $\times$  4.5-6.5  $\mu$ ; pores bright yellow..... 1. *T. onusta*.

*cristata* on which Patouillard based his *Cristella*, and the status of Masee's genus is the same as that of Patouillard's.

(5) *Phlebiella* Karst. Hedw. 29: 271. 1890; type, *Phlebia vaga* Fr. Karsten spelled the name "*Phlebriella*"; since he wrote also "*Phlebia vaga* Fr.," it is clear that the intrusive *r* is a lapsus calami, subject to correction under Art. 70 of the Rules. As Fries described *Phlebia vaga* in 1874 (Hym. Eur. 625.), that species was then certainly the same fungus as the one described by Bourdot & Galzin as *Corticium sulphureum*, and by Burt as *Hypochnus fumosus* (cf. Bourdot & Galzin, Hym. Fr. 234. [1928]; Rogers & Jackson, Farlowia 1: 304, 308. 1943.), a member of the *Humicola* group for which a generic name is here being sought. The definitive publication of *Phlebia vaga* is, however, that in Syst. Myc. 1: 428. 1821; and the description there leaves the name of somewhat more doubtful application. But if the 1874 description be taken as an elucidation of the one published in 1821, *Phlebia vaga* can be regarded as a species satisfactorily established, and Karsten's genus as satisfactorily typified by this member of the *Humicola* group. *Phlebiella* Karst. is then the correct name for *Trechispora sensu* Bond. & Sing.—that is, for at least most species of *Corticium* sect. *Humicola* Bourd. & Galz., and for their congeners now segregated in *Poria* and *Grandinia*.

In publishing his genus Karsten published no binomials, a neglect that does not invalidate the genus under the Rules. It may be inferred that he intended to call the type species *Phlebiella vaga* (Fr.) Karst., and that name is here published and attributed, properly, as it seems, to Karsten.

<sup>2</sup> Three species are included in the key for completeness, but are not described: (1) *Sistotrema confluens* Pers. ex Fr.; and two porioid forms of which no material was available for study, (2) *T. albo-pallescent* (Bourd. & Galz.) comb. nov. (= *Poria albo-pallescent* Bourd. & Galz. Bull. Soc. Myc. Fr. 41: 216. 1925; Hym. Fr. 656. [1928]; Donk, Nederl. Mycol. Ver. Med. 22: 220. 1933; = *Sistotrema albo-pallescent* (Bourd. & Galz.) Bond. & Sing. Ann. Myc. 39: 47. 1941), and (3) *T. albo-lutea* (Bourd. & Galz.) comb. nov. (= *Poria albo-lutea* Bourd. & Galz. Bull. Soc. Myc. Fr. 41: 217. 1925; Hym. Fr. 657. fig. 181. [1928]; = *Sistotrema albo-lutea* (Bourd. & Galz.) Bond. & Sing. Ann. Myc. 39: 47. 1941). From the descriptions (for which the Hyménomycètes de France should be consulted) these porioid species seem to be quite distinct. *Corticium suecicum* Litsch. and *C. niveo-cremeum* Höhn. & Litsch. are both included in the key and described, because they resemble, and may be sought in, this genus, and because Bourdot & Galzin treated them as *urnigera* forms.

3. Basidia with distal portion strongly expanded at the summit; pores white, creamy, or finally fulvous. . . . . 4
4. Spores subglobose, even,  $2.5-4.5 \times 2-4 \mu$ ; pores white or creamy. . . . . *T. albo-pallescent.*
4. Spores subglobose, even, larger than  $4.5 \mu$ , or rough-walled, or oblong, or rarely obovate and  $4.5 \mu$  or less in length; pores in all but rough-spores specimens becoming sulfur to fulvous. . . . . *T. albo-lutea.*
5. Spores fusiform. . . . . 2. *T. raduloides.*
5. Spores subglobose or ellipsoid. . . . . 3. *T. muscicola.*
6. Spores tetrahedral. . . . . 4. *T. subtrigonosperma.*
6. Spores subglobose (obovate or very short ellipsoid). . . . . 5. *T. diademifera.*
6. Spores even, ellipsoid or more elongate. . . . . 7
7. Gloecystidia present. . . . . 8
7. Gloecystidia lacking. . . . . 9
8. Basidia with 6-8 sterigmata  $3-4 \mu$  long; spores depressed or curved,  $4.5-6 \times 2-3 \mu$ . . . . . 6. *T. coronifera.*
8. Basidia with 4 longer sterigmata; spores straight,  $5.5 \times 3 \mu$  or larger. . . . . 7. *T. Sernanderi.*
9. Basidia formed in compact clusters through proliferation of the subtending clamps, distinctly urniform; spores oblong-ellipsoid to subcylindric, straight or slightly depressed,  $3.5-7 \times (1.5-) 2-3 (-4.5) \mu$ . . . . . 8. *T. Brinkmanni.*
9. Basidia borne at various levels, in looser clusters, narrow-urniform or in part clavate; spores strongly curved, or straight and  $5.5-9 \times 2.5-3.5 \mu$ , or oblong. . . . . 10
10. Basidia narrow-urniform; spores strongly curved. . . . . 9. *T. Hirschii.*
10. Basidia frequently or always claviform; spores not much curved. . . . . 11
11. Basidia in part urniform, in part claviform, variable in length; spores cylindric, straight or slightly curved. . . . . 10. *Corticium niveo-cremeum.*
11. Basidia clavate, uniform in length; spores oblong. . . . . 11. *Corticium suecicum.*

1. TRECHISPOREA ONUSTA Karst. Hedwigia 29: 147. 1890; Bidr. Känned. Finl. Nat. Folk 54: 179. 1893. (FIG. 1)

*Poria onusta* (Karst.) Sacc. Syll. Fung. 11: 95. 1895; Bres. Ann. Myc. 6: 41. 1908; Bourd. & Galz. Bull. Soc. Myc. Fr. 41: 218. 1925; Hym. Fr. 658. [1928]; Baxter, Mich. Acad. Papers 15: 222. 1932.

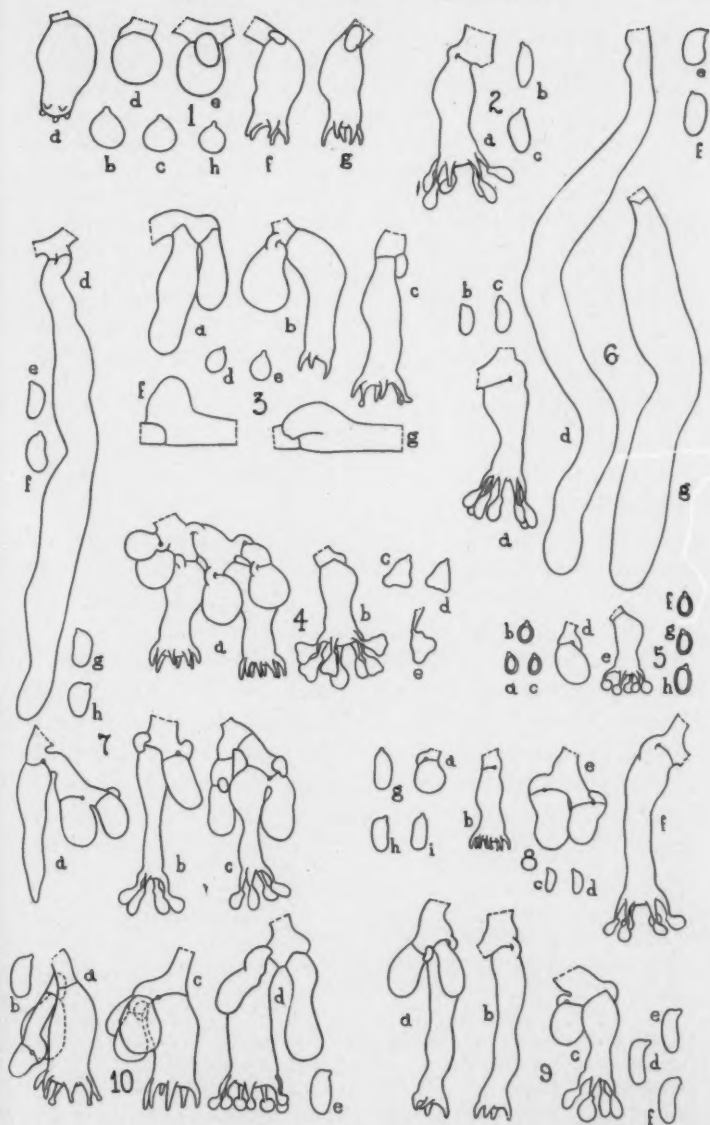


FIG. 1. *Trechispora onusta*; 2, *T. raduloides*; 3, *T. muscicola*; 4, *T. subtrigonosperma*; 5, *T. diademifera*; 6, *T. coronifera*; 7, *T. Sernanderi*; 8, *T. Brinkmanni*; 9, *T. Hirschii*; 10, *Corticium niveo-cremeum*.

Fructification porioid, the margin byssoid, creamy, the pores angular, shallow, with walls very thin and fragile, ochraceous-yellow (Cream Buff to Antimony Yellow R in old material); hyphae  $2\text{--}6.5\ \mu$ , in part collapsed, mostly thin-walled but with some elements a little thick-walled, with clamps throughout and at times strongly ampulliform; occasional sterile basidia with acuminate prolongation tipped with a small mass of refractive material; fertile basidia arising as broad-ellipsoid bodies about  $12 \times 9\ \mu$ , mostly laterally attached to the parent cell, later with a short obtuse-cylindric prolongation not sharply delimited at the base,  $4.5\text{--}5\ \mu$  in diameter, the mature basidia  $14\text{--}22 \times 8\text{--}9\ \mu$ , bearing more than 4 stout sterigmata  $4.5\ \mu$  long; spores even, thin-walled, subglobose or short-oblong, distinctly flattened on the inside,  $5\text{--}7 \times 4\text{--}6\ \mu$ .

On dead pine needles and wood of *Salix caprea*.

Specimens examined: Finland (Mustiala, in *Salix caprea*, P. A. Karsten, type, FH-P), Poland (Oct., Eichler, ex herb. G. Bresadola 86, NY).<sup>4</sup>

A poor *Poria*, well segregated from that genus, but infelicitously named, since the spores are smooth. There appear to be reports of urnigera basidia in only the three species of *Poria* treated in Bourdot & Galzin; from all others, unless microscopic characters have been neglected by students of the group, these three should be readily distinguishable by the basidia. From *T. albo-pallescent* *T. onusta* should differ in color and in larger basidia and spores; from *T. albo-lutea* it should be distinguishable by the cylindric rather than expanded prolongation of the basidium, by the mycelium which lacks "guttulate"—i.e., gloeocystidioid—segments, and perhaps by the greater diameter of the larger hyphae.

## 2. *Trechispora raduloides* (Karst.) comb. nov. (FIG. 2)

*Hydnum raduloides* Karst. Soc. Faun. Fl. Fenn. Med. 9: 110. 1883.

<sup>4</sup>Herbaria from which specimens are cited have been indicated by the following standard abbreviations: BPI, Bureau of Plant Industry, U. S. Department of Agriculture; FH, general collections of the Farlow Herbarium, Harvard University; FH-B, its Burt collection; FH-H, its Höhnelt collection; FH-P, its Patouillard collection; NY, New York Botanical Garden; TRT, cryptogamic herbarium of the University of Toronto.

*Grandinia raduloides* (Karst.) Bourd. & Galz. Hym. Fr. 412. [1928]; Miller, Mycologia 25: 361. pl. 43, fig. 1. 1933; Miller & Boyle, Univ. Iowa St. N. H. 18: 13. pl. 1, fig. 10. 1943.

Fructification composed of a fragile, byssoid-membranous subiculum and terete or irregular, fragile, slightly tapered spines sometimes with byssoid tips, the spines, subiculum, and margin creamy buff, or with small areas on the spines darkened; both spines and subiculum fertile; hyphae with fairly rigid walls but often shrunken content, with prominent clamps throughout,  $2.5\text{--}5\text{ }\mu$  in diameter and swollen at many septa to  $7\text{ }\mu$ , in part with yellow-granular, resinoid content like that of gloeocystidia; basidia in small clusters, when immature stipitate-ovate, forming a clavate or abruptly expanded prolongation, when mature  $12.5\text{--}27.5\text{ }\mu$  long, the neck  $5\text{ }\mu$  in diameter, the base  $5.5\text{--}8\text{ }\mu$ , the summit  $5.5\text{--}7\text{ }\mu$ , bearing usually 8 sterigmata  $4\text{--}5\text{ }\mu$  long and recurved; spores fusoid, slightly thick-walled,  $6\text{--}8.5 \times 2.5\text{--}3\text{ }\mu$ .

On wood of broad-leaved trees.

Specimens are at hand from Ontario and Iowa.

Basidia distinctly urniform, and more like those of some specimens of *T. Brinkmanni* than like the short-necked structures which characterize the similarly hydroid *T. muscicola*. Readily distinguishable by the spores.

### 3. *Trechispora muscicola* (Pers.) comb. nov. (FIG. 3)

*Hydnum muscicola* Pers. Myc. Eur. 2: 181. 1825.

*Grandinia muscicola* (Pers.) Bourd. & Galz. Bull. Soc. Myc. Fr. 30: 252. 1914; Hym. Fr. 411. fig. 112. [1928]; Bourd. Bull. Soc. Myc. Fr. 48: 219. 1932.

Fructification consisting of delicate terete spines, obtuse or subacute, about 0.5 mm. long, borne on a fragile-membranous, separable subiculum, the spines, sterile margin, and subiculum when dry strongly ochraceous; hyphae in part completely collapsed, in part distinct,  $2.5\text{--}4\text{ }\mu$ , with distinct ampullae or inflated clamps at the septa often up to  $10\text{ }\mu$  in diameter; immature basidia relatively large, broadly ellipsoid or obovate,  $12\text{--}14 \times 7\text{--}9\text{ }\mu$ , later with a short subcylindric prolongation only slightly or not at all expanded at the summit, at maturity  $16\text{--}24 \times 6\text{--}8\text{ }\mu$ , bearing 5-6 (?-8) short subulate sterigmata; spores ellipsoid, basally attenuated,  $4\text{--}5.5 \times 3\text{--}3.5\text{ }\mu$ .

On vegetable debris.

Specimens examined: France (Perseviaille, Aveyron, Galzin 16455, det. Bourdot 17785, ex herb. L. Maire, FH; Bouisson,

Aveyron, *Galzin 16261*, ex herb. Bourdot *15202*, C. G. Lloyd *24356*, BPI).

*Trechispora muscicola* closely resembles *T. onusta* in color, texture, hyphae, form of spores, and especially in basidia with relatively large basal portion and short unexpanded prolongation. Although the spores are smaller in the present species, there would be slight grounds for separating the two if it were not for the different hymenial configurations; they are certainly related to each other more closely than either is to any other species at hand or adequately described in *Poria* or *Grandinia*. With its minute but well developed spines *T. muscicola* is a good *Hydnum* in the early Friesian sense, and not in the least a *Grandinia* as Fries described that genus ("hymenium . . . papilloso-verrucosum"). According to Fries's own account of *Hydnum diaphanum* (Hym. Eur. 616. 1874), the present species cannot be the same as that fungus, to which Fries subordinated it. Bourdot bears witness (l.c. 1932) that his *Grandinia* is the same as material in Persoon's herbarium of *H. muscicola*. Bourdot's description, drawn up from more ample material than was available for the account here given, should be consulted for the range of variation of the species; most notably, he states that the fructification may be cream-color, in this agreeing with Persoon. There is no material at hand from which to verify the additional synonymy given in the Hyménomycètes de France.

4. TRECHISPORA SUBTRIGONOSPERMA (Rogers) Rogers & Jackson,  
Farlowia 1: 328. 1943. (FIG. 4)

*Sistotrema subtrigonospermum* Rogers, Univ. Iowa St. N. H. 17:  
22. pl. 2, fig. 10. 1935.

(*Hypochnus asterophorus* sensu Rick, Brotéria sér. trim. Ciênc.  
Nat. 3: 151. 1934; sed vix *H. asterophorus* Bon. Handb. 160.  
fig. 256. 1851.

Fructification even, pruinose, when fresh barely waxy, grayish-white, drying to form a delicate bloom, under the binocular white, finely arachnoid; hyphae irregular, 3-5 (-8)  $\mu$  in diameter, with clamps throughout; basidia at first subglobose to ellipsoid, at maturity urniform, 12-18  $\mu$  long, 6  $\mu$  thick at the base, 4  $\mu$  at the neck of the prolongation, bearing 6 peripheral sterigmata

2.5  $\mu$  long; spores tetrahedral, attached at one of the points, 4.5–5  $\times$  3–4.5  $\mu$ .

On *Acer* sp., *Quercus* sp., and *Ulmus* sp.

Specimens have been examined from Brazil (*Rick*, some specimens as *H. asterophorus*), Jamaica, Ontario, Wisconsin, and Iowa.

Readily distinguished by the spores. In *Corticium trigonospermum* Bres. similar spores are attached by an apiculus arising on the middle of one side; from it the present species differs also in all other respects—basidia, mycelium, texture, and so on. Nor does the present fungus seem to be *Hypochnus asterophorus* ("bildet ein dichtes, faseriges Stratum . . . sternförmige Sporen"—Bonorden, l.c.). *Corticium fibrillosum* (Burt) Rogers & Jackson, Farlowia 1: 307. 1943, has spores not merely tetrahedral, but lobate and spinulose.

5. *Trechispora diademifera* (Bourd. & Galz.) comb. nov. (FIG. 5)

*Corticium diademiferum* Bourd. & Galz. Bull. Soc. Myc. Fr. 27: 244. 1911; Hym. Fr. 238. [1928]; Wakef. & Pears. Br. Myc. Soc. Tr. 8: 217. fig. 2. 1923.

*Corticium diademiferum* var. *perfuga* Bourd. & Galz. Hym. Fr. 238. [1928].

Fructification very thin, whitish, a pruinose or waxy-crustose film, closely adnate, when dry pruinose or vernicose; hyphae with clamps throughout, 1.5–5.5  $\mu$ , fairly distinct or (in dried material) sometimes completely disintegrated and invisible; in some hymenia contorted sterile bodies present among the basidia, 17–30  $\times$  4–6  $\mu$ , irregular in diameter, with hyaline content; basidia at first subglobose or short-pyriform, 6.5–8 (–13.5)  $\times$  5–7 (–10)  $\mu$ , developing a short apical prolongation, at maturity expanded at the summit, 9–27.5 (–31)  $\times$  4.5–8 (–9)  $\mu$ , bearing 6–8 peripheral recurved sterigmata 2–4 (–4.5)  $\mu$  long; spores obovate-subglobose or short-ellipsoid, abruptly attenuate at the base, 3–4.5 (–6)  $\times$  2–4 (–5)  $\mu$ .

American specimens on wood of *Picea sitchensis*, *Pinus contorta*, *P. Strobus*, *Pyris Malus*, and *Quercus* sp., on leaves of *Populus tremuloides*, and on decaying fabricated trichomes of seeds of *Gossypium barbadense*.

Specimens have been examined from France (Allier, Bourdot 5700, FH-B), Panama, Ontario, Massachusetts, New York, Iowa, and Oregon.



Readily identified by the "subglobose" spores. The French specimen has fairly distinct hyphae and spores  $3-4 \times 2.5-3 \mu$ . A specimen collected by Pearson and determined by Bourdot is reported (Wakefield & Pearson, l.c.) likewise to have spores "ovate rather than subglobose." Six of the American specimens are almost identical, with collapsed hyphae and abundant spores  $3-3.5 \times 2-2.5 \mu$ . One of these is from the Oregon coast; two other collections from the same region are larger in all parts and have distinct hyphae. Since the authentic material cited, and a specimen from Nantucket, lie between these extremes, there appears no reasonable alternative to including all in the one species. The large specimens agree in most respects with the description of the var. *perfuga*.

6. TRECHISPORA CORONIFERA (Höhn. & Litsch.) Rogers & Jackson, Farlowia 1: 282. 1943. (FIG. 6)

*Gloeocystidium coroniferum* Höhn. & Litsch. Akad. Wiss. Wien Math.-Nat. Kl. Sitzungsab. 116, I: 825. 1907; Bourd. & Galz. Bull. Soc. Myc. Fr. 28: 370. [1913]; Hym. Fr. 264. [1928].

*Corticium coroniferum* (Höhn. & Litsch.) Sacc. & Trott. Syll. Fung. 21: 402. 1912; Wakef. & Pears. Br. Myc. Soc. Tr. 6: 139. (fig.) 1919.

*Corticium Atkinsonii* Burt, Mo. Bot. Gard. Ann. 13: 208. 1926.

Fructification when fresh very thin, waxy, pure white, under the binocular continuous or minutely granular, when dry whitish, adnate, under the binocular delicate reticulate-poroid; hyphae mostly distinct, (2-)  $3-7$  ( $-10.5$ )  $\mu$ , with clamps throughout, the basal long-celled, thick, sometimes filled with yellow refractive resinoid material, ampullate at the septa, not always well developed, the subbasidial more slender, abundantly branched; gloeocystidia (13-)  $20-100 \times (4.5-)$   $5-7$  ( $-9.5$ )  $\mu$ , elongate, obtuse, contorted, sometimes subcylindric, usually irregular, filled with yellow resinoid material; basidia when immature short-ellipsoid, forming a prolongation truncate-cylindric or slightly expanded at the summit,  $10-27.5 \times 5-7 \mu$ , bearing 6-8 slender peripheral sterigmata  $3-4 \mu$  long; spores oblong-ellipsoid to subcylindric, slightly depressed on the inside to curved,  $4.5-6 \times 2-3 \mu$ .

American material on undetermined conifer (?*Abies grandis*), *Acer* sp., *Populus grandidentata*, *P. tremuloides*, *Quercus* sp., and *Ulmus* sp.



Specimens have been examined from Austria (Bartberg bei Pressbaum, X.24.1906, *Höhnelt*, type of *G. coroniferum*, FH-H; and others), Ontario, Massachusetts, Vermont (Middlebury, 1896, *Burt*, as *Corticium arachnoideum*, FH-B; Battell Ledge, *Burt*, as *C. confine*, FH-B), New York (Ithaca, *Atkinson* 2558, type of *C. Atkinsonii*, FH-B), Louisiana (*Langlois* 246, paratype of *C. Atkinsonii*, FH-B), Iowa, and Oregon.

A form not notably differing from *T. Brinkmanni*, but here retained as a distinct species because it is distinguishable. The gloecystidia in the type are well developed, and many reach a length of 100  $\mu$ ; in none of the other specimens examined are they so large, although some are equally differentiated. In specimens with coarse basal mycelium having the same content as the gloecystidia the latter bodies may be difficult to detect; and a single specimen with highly developed gloecystidioid mycelium is included here even though it seems to possess no terminal hymenial bodies other than the basidia. It does not, however, seem possible to follow Bourdot (Hym. Fr. 237) in "assign[ing] to *G. coroniferum* those that exude in the trama an oily-resinous liquid"; most specimens of *T. Brinkmanni*, including the type of *C. coronilla* and the cited Brinkmann specimen of *O. Brinkmanni*, could be so described; calcium oxalate crystals may be present or lacking in them, as in the present species. As to *C. Atkinsonii*, it would be interesting to know what *Burt* saw in the *Atkinson* and *Langlois* specimens to compare with the dichophyses of *C. investiens*. The Altamount specimen which is the other paratype of *C. Atkinsonii* is sterile, and not *I. coronifera*.

7. *Trechispora Sernanderi* (Litsch.) comb. nov. (FIG. 7)

*Gloeocystidium Sernanderi* Litsch. Svensk Bot. Tidskr. 25: 437. fig. 1. 1931.

Fructification widely effused, when dry creamy white (between Cartridge Buff and Ivory Yellow R) or white, farinose-membranaceous, thin, separable in fragments, under the binocular delicately hypochnoid, the margin narrow and paler, or wanting; hyphae distinct or mostly collapsed, with prominent clamps throughout, 3-6  $\mu$ , the subhymenial abundantly branched, the basal long-celled, in part yellow-guttulate and gloecystidioid, sometimes inflated up to 7-14  $\mu$ ; gloecystidia obtuse, subcylind-

dric, slightly expanded near the base or the middle, with yellow granular refractive content,  $80-107 \times 6-8 \mu$ , long emergent; occasional sterile basidia acute, long-conic, cystidioid; basidia in clusters, arising as ellipsoid or oblong bodies about  $6 \mu$  in diameter, developing an emergent slender-subcylindric apical prolongation, at maturity  $17-23 \times 5-6 \mu$ , bearing (2-) 4 divergent subulate sterigmata  $4.5-5 \mu$  long; spores ellipsoid oblong, straight or depressed on the inside, obtuse at the distal end, short-attenuate at the base,  $5.5-7 \times 3-3.5 \mu$ .

North American material on *Fagus grandifolia*; South American on an unidentified gymnosperm.

Specimens have been examined from Sweden (Vardsätra, I.11.30, S. Lundell, **paratype**, TRT; Stockholm, XII.9.94, Romell, det. Litschauer, TRT), Chile, and Ontario.

Distinguishable from all species other than *T. coronifera* by the gloeocystidia, and from that species by the oblong rather than short-ellipsoid young basidia, by the slender, even basidial prolongation, by the sterigmata not more than four in number, and by the larger and straighter spores.

8. TRECHISPORA BRINKMANNI (Bres.) Rogers & Jackson, Farlowia 1: 288. 1943. (FIG. 8)

? *Corticium arachnoideum* Berk. Ann. Mag. Nat. Hist. 13: 345. pl. 9, fig. 3. 1844; nec *C. arachnoideum sensu* Burt, Mo. Bot. Gard. Ann. 13: 184. 1926; Bourd. & Galz. Hym. Fr. 197. [1928]; et auctt. plur.

? *Hypochnus coronatus* Bon. Hedwigia 15: 76. 1876; nec *H. coronatus* Schroet. in Cohn, Krypt.-Fl. Schles. 3(1): 418. 1888 (= *Pellicularia pruinata* (Bres.) Rogers; cf. Farlowia 1: 107. 1943).

*Odontia Brinkmanni* Bres. Ann. Myc. 1: 88. 1903; Bourd. & Galz. Bull. Soc. Myc. Fr. 27: 243. 1911; Donk, Nederl. Mycol. Ver. Med. 18-20: 139. 1931; Brown, Bot. Gaz. 96: 654. 1935.

*Corticium coronilla* Höhn. apud Höhn. & Litsch. Ann. Myc. 4: 291. (fig.). 1906; Bourd. & Galz. Bull. Soc. Myc. Fr. 27: 243. 1911; Hym. Fr. 236. [1928]; Donk, Nederl. Mycol. Ver. Med. 18-20: 137. 1931; Biggs, Mycologia 29: 686 et seq. fig. 21-26. 1937; Dodge, Mycologia 30: 133 et seq. fig. 1. 1938.

*Corticium octosporum* Schroet. ex Höhn. & Litsch. Ann. Myc. 4: 292. 1906; Bourd. & Galz. Bull. Soc. Myc. Fr. 27: 243. 1911;

Hym. Fr. 236. [1928]; Donk, Nederl. Mycol. Ver. Med. **18-20**: 138. 1931.

? *Heptasporium gracile* Bref. Unters. **15**: 111-116. pl. 5, fig. 1-10. 1912.

*Grandinia Brinkmanni* (Bres.) Bourd. & Galz. Bull. Soc. Myc. Fr. **30**: 252. 1914; Hym. Fr. 410. [1928]; Wakef. & Pears. Br. Myc. Soc. Tr. **6**: 74. (fig.). 1918; Miller, Mycologia **25**: 360. pl. 43, fig. 3. 1933; Miller & Boyle, Univ. Iowa St. Nat. Hist. **18**: 14. pl. 2, fig. 11. 1943.

*Corticium varians* Kniep, Zeits. Bot. **7**: 372. fig. 6-11. pl. 2, fig. 1-6, 12, 14-17, 20. 1915.

*Sistotrema coronilla* (Höhn.) Donk ex Rogers, Univ. Iowa St. Nat. Hist. **17**: 23. pl. 2, fig. 11. 1935.

(*Corticium alutaceum sensu* Lyman, Bost. Soc. Nat. Hist. Proc. **33**: 160. pl. 19. 1907; nec *C. alutaceum* [Schrad.] ex Bres., Ac. Agiati Atti III **3**: 110. 1897 (= *C. radiosum* (Fr. ex Pers.) Fr., Epicr. Syst. Myc. 560. 1838).

(*Corticium masculi* Sprau, Jahrb. Wiss. Bot. **85**: 163. fig. 1-7. 1937, nomen nudum.

Fructification thin, even or minutely papillose, when fresh waxy-pruinose, waxy-farinose, farinose-arachnoid, or delicately membranous, grayish (when very thin), glaucous, or pure white, when dry pruinose and barely visible, vernicose, farinose, arachnoid, or rarely subpellicular or coarsely reticulate-fibrillose, white or rarely changing to yellowish (Massicot Yellow R); hyphae thin-walled, with large clamps throughout, the subicular 4-7  $\mu$  in diameter, straight- and long-celled, sometimes inflated at the septa to 9  $\mu$  (ampullate), often rare or wanting, the subhymental short-celled, contorted, abundantly branched, (1.5-2-) about 4  $\mu$  in diameter, occasionally firm, usually collapsed, with contents often condensed into refractive resinoid masses, frequently interspersed with coarse crystalline material; basidia formed in clusters as the result of repeated proliferation from the subtending clamps, when immature subglobose to oblong, elongating by a cylindrical outgrowth truncate and more or less expanded at the summit (to 5.5  $\mu$ ), at maturity (7-) 10-24 (-27)  $\times$  (4-) 5-6 (-8)  $\mu$ , bearing about the periphery of the summit rarely 4 or 5, usually 6-8 recurved, capillary or subulate sterigmata 3-5  $\mu$  long; spores oblong-ellipsoid to subcylindric, straight or slightly depressed on the inside or very slightly curved, abruptly attenuate toward the apiculus, 3.5-7  $\times$  (1.5-) 2-3 (-4.5)  $\mu$ .

Imperfect stages: Some specimens develop, in nature or in culture, small brownish bulbils on the hymenium (cf. Biggs, and Lyman, ll. cc.); one (TRT 17325) shows below the hymenium abundant falcate fusoid bodies  $60-80 \times 7-8 \mu$ , 2-3-septate, with clamps, which appear to be conidial in function; Biggs reports the formation in culture of simple oidia.

American specimens on *Armillaria mellea*, *Ganoderma* sp., *Gloeotulasnella Pinicola*, *Hapalopilus gilvus*, *Peniophora* sp., *Piptoporus Betulinus*, on bark or wood of *Abies balsamea*, *Picea sitchensis*, *Pinus Strobus*, *Pinus* sp., *Pseudotsuga mucronata*, *Tsuga canadensis*, *Acer macrophyllum*, *A. rubrum*, *A. spicatum*, *Alnus oregana*, *A. tenuifolia*, *Arctostaphylos columbiana*, *Betula lutea*, *Betula* sp., *Carya ovata*, *Fagus grandifolia*, *Liquidambar styraciflua*, *Populus balsamifera*, *P. tremuloides*, *Pyrus Malus*, *Quercus Garryana*, *Q. macrocarpa*, *Quercus* spp., *Rhus* ? *glabra*, *Salix* spp., *Tilia americana*, *Ulmus americana*, *Vitis vulpina*, and on a pistillate rhachis of *Zea Mays*.

Specimens have been examined from Germany (Ollersdorferwald bei Rastatt, Schlesien, IV.24.77, *Schroeter*, type of *C. octosporum*, FH-H; Lengerich, Westfalen, IV.1905, *Brinkmann*, Westf. Pilze 112, as *O. Brinkmanni*, FH), Austria (Wiener Wald, Mödling, 1904, Höhnle, type of *C. coronilla*, FH-H; and others), England (*Berkeley*, as *C. arachnoideum*, perhaps type, FH), British Guiana, Panama, Nova Scotia, Ontario, Massachusetts, Rhode Island, New York, Virginia, North Carolina (Chapel Hill, *Couch* 4225, det. Burt as *C. incanum* Burt), Ohio, Tennessee, Iowa, Missouri, Idaho, and Oregon.

A collection of fungi exhibiting bewildering variability. Of all possible bases for subdivision of this complex, hymenial configuration is the most unnatural and the least usable in practice. As already noted by Bourdot, numerous specimens show both even and granulose areas; since the corticioid and grandinioid phases do not then characterize different individuals, they can scarcely justify separation into different genera and families—unless one should wish to dissect from the hymenia of his *Corticium* specimens fragments to be filed with his Hydnaceae. Furthermore, the type of *C. coronilla* and the cited Brinkmann specimen of *O. Brinkmanni* are completely indistinguishable

microscopically, and differ only in the slightly less delicate fructification of the latter and in the presence or absence of scattered granules. And finally, Biggs (l.c.) found a grandinoid tendency in more than one of the strains of this complex which she studied in culture.

The existence of occasional fructifications in which the hyphae do not collapse has suggested another possible basis for subdivision. Litschauer (litt. & specim.) and presumably Bourdot (1928) used regular mycelium, together with ellipsoid spores, to set off *C. octosporum* from *C. coronilla*. In the extensive material at hand, distinct and regular mycelium exists in combination with several sets of other characters; consequently, unless one is to be content to segregate on the basis of mycelium, disregarding texture, basidia, and spores, such a division cannot be maintained. The type of *C. coronilla* is (under the binocular, at a magnification of about 30X) minutely byssoid, with fimbriate margins; but the hyphae are almost completely collapsed, with irregular refractive masses in the distorted cells. The type of *C. octosporum* shows the uncollapsed mycelium that has been attributed to that species; but even so, the cells are short, irregular, and abundantly branched (as they are supposed to be rather in *C. coronilla*), and the fructification is so delicately pruinose as to be almost invisible. Furthermore, since specimens are at hand showing in the same preparation both rigid, straight-celled mycelium and collapsed, refractive, almost amorphous areas of disintegrating cells, the mycelium is apparently not only no basis for separation of *octosporum* from *coronilla*, but also of no great significance within the complex under discussion.

In different collections basidia differ in shape of the immature body (subglobose to oblong), in width of the base (compare fig. 21-23 of Biggs with her 24-25), in length of the prolongation, in degree of expansion of the summit, and in stoutness of the sterigmata. Spores differ greatly, not only in size, but also in form. Since both basidial and spore characters are quite constant within any one collection, it is probable that any future subdivision will have to rest on them. Even then, *C. coronilla* (with *O. Brinkmanni*) and *C. octosporum* must be kept together; in the type specimens the basidia are nearly identical in size

and form, and the spores of *octosporum* are only slightly longer and less rounded (*pace* Bourdot and Litschauer, according to whose treatments of these fungi the spores of *octosporum* should be ellipsoid, and therefore more rounded).

In 1937 Biggs published the results of an intensive study of *Corticium coronilla* (l.c.). On the grounds of constant differences shown in laboratory cultures she divided twenty-two collections, all but one from Ontario, and all but four from Lake Temagami, into four groups, of which one was further split into three subgroups. Her groups "differed from each other in general growth, presence or absence of asexual reproductive structures, ability to produce basidia in culture, and type of heterothallism." These cultural characters she then correlated, as far as possible, with characters of the parent collections as they were brought in from the field. From study of six additional collections she concluded that "the range in spore characters among these additional specimens must indicate the occurrence of yet other groups." These four groups studied in culture, according to Biggs, "differ from each other in profound and fundamental characters" and "represent distinct species"; presumably the same would be true of such other groups as remain less perfectly studied. Because of the difficulty of recognizing such species among the fungi as they occur in nature, because of the large number of species that would have to be recognized within "*Corticium coronilla*" to include the four described and the many undetected groups, and because of the difficulty of identifying any of her groups with established species, she chose, as a practical measure, to retain the single "collective species."

Dr. H. S. Jackson very generously offered the loan of the complete series of collections from which Biggs's cultures were derived, and I have examined them all and compared a representative of each of her groups with the types of *C. coronilla* and *C. octosporum* and the cited Brinkmann specimen of *O. Brinkmanni*. Her Group I is, as stated in her discussion, highly homogeneous. Group II is considerably less so, and is separable from Group I only by the spores, which are always flattened in Group I and, although variable in other respects, always depressed on the inside in Group II. The specimens included in Group III are



all somewhat pellicular and have their hyphae fairly distinct rather than collapsed; all have turned yellowish in the herbarium. The spores and basidia, however, are greatly variable, and one specimen has many gloeocystidioid hyphal segments. Group IV, which includes those specimens so delicate as to appear little more than a bloom to the naked eye, is quite homogeneous in other respects also; its spores are depressed, but proportionately shorter than those in Group II, and its immature basidia are more nearly globose. The type of *C. octosporum* would from its external characters belong to Group IV; its spores are those of Group III, and its basidia those of Group I or II. Externally and microscopically the type of *C. coronilla* would fall in Group I. Externally the Brinkmann specimen of *O. Brinkmanni* is a little more robust than most specimens of Group I, but might well be included there; microscopically, it is Group I.

When one has carefully noted the range of variation of these fungi it seems impossible to retain them all in a single species. After repeated and minute study of some hundred and fifty specimens, however, I can find no natural basis for segregation. The various sorts of characters—color, texture, mycelium, basidia, and spores—seem to show no correlation, but to exist in all possible combinations. Fructifications which are yellow, pellicular, and accompanied by bulbils, like her Group IIIb (and IIIc!) may differ considerably from Group III in microscopic characters. Specimens which appear to belong in Group IV may (like the type of *C. octosporum*) have spores more like those of Group III; and so on, *ad infinitum*. Briefly, it seems probable that a natural basis for subdivision will be found; but so far none has been detected.

There remains the question of the correct name for the species under discussion. *C. coronilla*, *C. octosporum*, and *O. Brinkmanni* are, as already implied, demonstrably the same. While Brefeld's characteristic aversion to the enumeration of definite characters makes it impossible to prove that *H. gracile* Bref. belongs here, it is just possible, if one is both imaginative and charitable, to develop from his turgid pages a sort of latent diagnosis for his culture-artifact, from which it may be inferred that the species can hardly belong anywhere else. Although Kniep does not

emphasize the form of the basidia in his species, *C. varians* probably belongs here also. *Hypochnus coronatus* Bon. can from its description belong nowhere but in *Trechispora*, and quite likely is the present species. There is, however, at least a possibility that it is some other species of the genus; and because *O. Brinkmanni* can have its characters better fixed, the uncertainty concerning *H. coronatus* is here recognized, and the later name used. As to *C. arachnoideum*: There are in the Farlow Herbarium two specimens from Berkeley of that species. One, in the Curtis collection, is a member of *Corticium* sect. *Pellicularia* Bourd. & Galz.; but unlike the *C. arachnoideum* of most authors, it has no clamps whatever (cf. Rogers & Jackson, *Farlowia* 1: 286. 1943). The other, in the general collections, is the present species. Both fungi are on the substratum originally noted for *C. arachnoideum*; either (or each) may be a portion of the type. Now Berkeley described the hymenium of his fungus as "consisting of elliptic sporophores arranged in little bunches"—not a bad description of the proliferating clusters of immature basidia seen in the present fungus, and well shown in the Berkeley specimen of it. In trying to match Berkeley's description later authors have apparently looked for elliptic spores rather than elliptic "sporophores"; the basidia of *C. arachnoideum* in the sense of most authors are not elliptic, but claviform. It seems therefore extremely probable that the correct name for the urnigera species under discussion must be derived from *C. arachnoideum* Berk.; it is desirable, however, to await word from Kew concerning the nature of Berkeley's no. 3974, designated by Massee (*Linn. Soc. Bot. Jour.* 27: 135. 1890) as the type—or, if that be a later collection, concerning whatever specimen demonstrably is the type—before adopting Berkeley's name. Meanwhile, Bresadola's specific epithet will serve.

9. *Trechispora Hirschii* (Donk) comb. nov. (FIG. 9)

*Corticium Hirschii* Donk, *Nederl. Mycol. Ver. Med.* 18-20: 139. 1931.

Fructification when fresh grayish, waxy-mucedinoid, when dry cinereous with a rosy tint (a little lighter than Pale Ecu-Drab R), thin crustose, closely adnate, under the binocular conglutinate, finely rimose with a few fibrils visible in the cracks, the arcoles



with a minutely granular surface; mycelium distinct, with clamps throughout,  $2.5-4.5\ \mu$  in diameter, the basal long-celled and with walls somewhat thickened, the subhymenial thin-walled but rigid; basidia in small clusters (from proliferation of the subtending clamps) and also at various levels along the fertile hyphae, arising as evenly ellipsoid bodies about  $7 \times 5\ \mu$ , developing a cylindrical prolongation slightly expanded at the very summit, at maturity narrowly urniform,  $15-25 \times 4.5-5\ (-6)\ \mu$ , bearing 4 straight sterigmata  $2-3\ \mu$  long; spores evenly cylindric, strongly curved, especially toward the apiculus, obtuse,  $5-8 \times 2-2.5\ \mu$ .

On decorticate wood of *Populus grandidentata* and *Quercus Garryana*.

Specimens seen from Iowa and Oregon.

A species resembling *C. niveo-cremeum* in the production of basidia at various levels on the fertile hyphae, differing from it in the invariably narrow-urniform basidia, and from all remaining species of *Trechispora* in the strongly curved spores, the slightly thickened mycelial walls, and the pinkish-ashy color. As described by Donk, the fungus should have some spores larger ( $7-11 \times 2-4\ \mu$ ) and mycelium less well developed. Because of the variability of other species of the genus, it seems imprudent, in the absence of an authentic specimen of *C. Hirschii*, to attempt to segregate the material here described.

#### SPECIES EXCLUDENDAE

10. *CORTICIUM NIVEO-CREMEUM* Höhn. & Litsch. Akad. Wiss. Wien Math.-Nat. Kl. Sitzungsab. **117**, I: 1117. 1908; Bourd. & Galz. Bull. Soc. Myc. Fr. **27**: 244. 1911; Hym. Fr. 237. fig. 72. [1928]; Wakef. & Pears. Br. Myc. Soc. Tr. **6**: 71. (fig.) 1918; Kühner, Le Botaniste **17**: 32. fig. 9. 1926; Donk, Nederl. Mycol. Ver. Med. **18-20**: 138. 1931. (Fig. 10)

(*Corticium niveo-cremeum* Höhn. & Litsch., Wiesner-Festschr. **65**. 1908 (nomen nudum).

Fructification thin, adnate, waxy, pruinose or crustose, whitish, when dry pruinose to crustose, under the lens poroid-reticulate to subcontinuous, rimose, the elements conglutinate to form a shining film over the surface, whitish or sordid-whitish to brownish where bruised; hyphae distinct, with clamps throughout,  $2-5\ \mu$  in diameter; basidia in small loose clusters formed through

the proliferation of the subtending clamps, and also arising at various levels on the fertile hyphae, at first ellipsoid-obovate to obpyriform, about  $12 \times 7 \mu$ , sometimes with a narrow stipe up to  $20 \mu$  long, at maturity broadly clavate to subcylindric, sometimes distinctly constricted, but at no stage composed of broad basal vesicle and narrow prolongation, variable in length,  $(12.5-18-42 \times (5-6-8 \mu$ , bearing 4-8 peripheral sterigmata  $4-4.5 \mu$  long; spores obtuse, cylindric, straight or only slightly curved,  $(5.5-7-9.5 \times (2.5-3-3.5 \mu$ .

American specimens on *Abies balsamea*, ? *Fagus grandifolia*, *Quercus* sp., and unidentified hardwoods.

Material has been examined from Austria (Saagberg, Wienerwald, III.11.1905, Höhnelt, type, FH-H), Netherlands, France, Ontario, Massachusetts, Rhode Island, Pennsylvania, Iowa, and Missouri.

Strongly resembling *urnigera* species in the clusters of obovate immature basidia, in possession of more than four sterigmata, and in basidia sometimes constricted (and therefore apparently urniform and with expanded prolongation). The development of these basidia seems, however, not to be that of the *urnigera* type—not to pass through stages of (1) inflated basal vesicle, (2) narrow subcylindric prolongation, and (3) apical expansion—and *C. niveo-cremeum* seems not to be closely related to such species as *T. Brinkmanni*. Of *C. niveo-cremeum* Bourdot wrote (Bull. Soc. Myc. Fr. 27: 243. 1911), "a well developed species which departs somewhat from the type of this group [*Ur nigera*]." It is recognizable among the species with more than four sterigmata by the origin of basidia at various heights and variability in their length, and by large spores and basidia.

11. *CORTICIUM SUECICUM* Litsch. apud Lundell & Nannfelt, Fung. Exs. Suec. 464. 1937; Svensk Bot. Tidskr. 32: 286. 1938; Rogers & Jackson, Farlowia 1: 285. 1943. (FIG. 11)

? *Thelephora illinita* Wallr. Fl. Crypt. Germ. 2: 564. 1833.

*Corticium calceum sensu* Bourd. & Galz. Hym. Fr. 237. [1928]; Donk, Nederl. Mycol. Ver. Med. 18-20: 137. 1931; Bourd. Bull. Soc. Myc. Fr. 48: 211. 1932; nec *C. calceum* (Pers.) Fr. Epicr. Syst. Myc. 562. 1838 (= *Sebacina calcea* (Pers.) Bres. Fung. Trid. 2: 64. 1898); nec *C. calceum* "Fr. emend. Romell & Burt" in Burt, Mo. Bot. Gard. Ann. 13: 203. 1926 (nomen confusum).

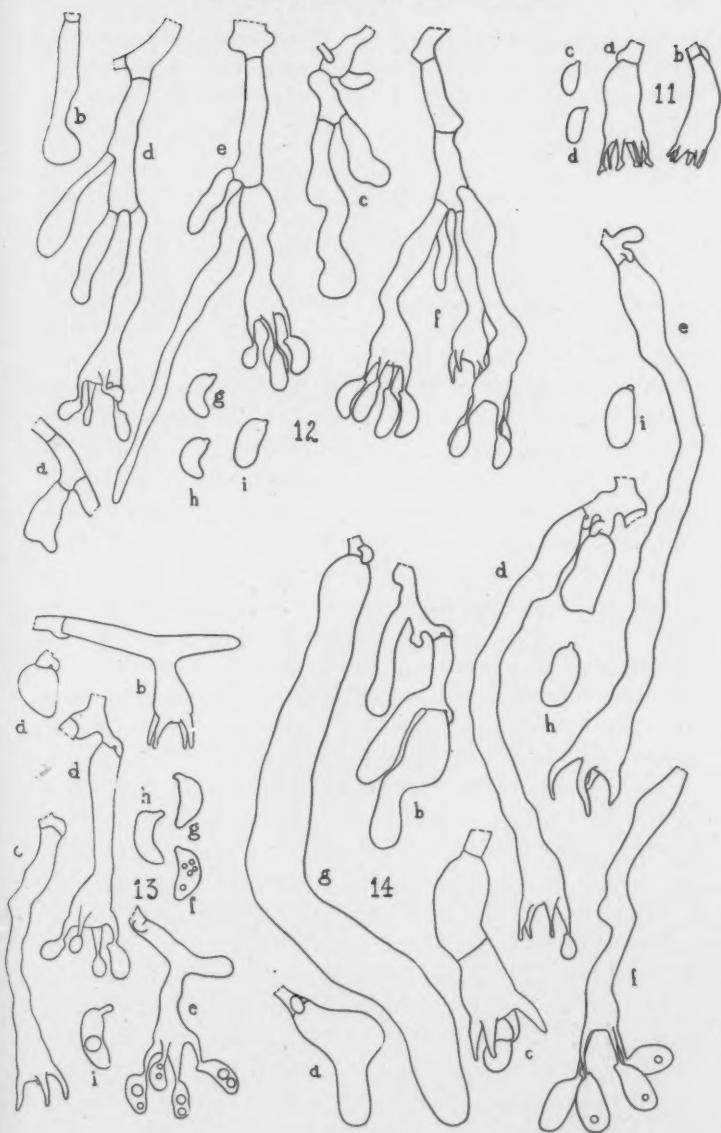


FIG. 11. *Corticium suecicum*; 12, *Galzinia cymosa*; 13, *G. pedicellata*; 14, *G. occidentalis*.

Fructification adnate, at first grayish, waxy-pruinose, soon pure white, waxy-crustose, not coherent, even or tuberculose, when dry crustose-membranaceous, the surface a little glazed, creamy whitish, continuous or reticulate-poroid or abundantly rimose, separable only in mealy flakes; hyphae thin-walled, with clamps throughout,  $2-5 (-7) \mu$  in diameter, with some inflated segments, at first distinct but in mature fructifications mostly collapsed; basidia clavate, abruptly tapered toward the base,  $15-25 \times 5-7 \mu$ , subtended by proliferating clamps, bearing about the obtuse or somewhat truncate summit 6 slender-subulate sterigmata  $3.5-4.5 \mu$  long; spores even, with wall slightly thickened and refractive, oblong, sometimes a little depressed on the inside,  $(4-) 5-7 (-8) \times 2.5-3.5 \mu$ .

American specimens on wood of *Abies balsamea*, *Picea* sp., *Pinus Strobus*, *Pseudotsuga mucronata*, *Thuja occidentalis*, *Acer saccharum*, *Alnus oregana*, and *Castanea dentata*.

Specimens have been examined from Sweden (Bygget, 1909, *C. G. Lloyd* 09,128, det. Bourdot as *C. calceum*, **paratype**, BPI), Ontario, Massachusetts, New York (*C. H. Peck* 9, 20; *G. F. Atkinson* 941, all det. Burt as *C. calceum*, FH-B), Ohio, Oregon.

A species resembling the *Urnigera* fungi in the origin of basidia from proliferative clamps and in the regular occurrence of six sterigmata to the basidium. Its basidia do not, however, pass through any of the developmental stages characteristic of *Trechispora*, nor are they ever urniform at maturity. Readily recognized by the claviform basidia, which in dried collections are especially apt to become imperfectly stainable, to collapse at the summit so as to become sharply truncate, and to retain, on almost invisible sterigmata, the cluster of six immature spores—and, of course, even more readily recognized by the number of sterigmata.

For further discussion of the history of *C. calceum* notes by Donk (l.c.) and Rogers & Jackson (*Farlowia* 1: 284. 1943) may be consulted. *Thelephora illinita* Wallr. may well be the present species, but may equally well be *Peniophora gracillima* Ellis & Ev. ex Rogers & Jackson, *Farlowia* 1: 317. 1943, or, like *P. glebulosa* (Fr.) Sacc. & Syd., a combination of two fungi. Since it is quite impossible to make a reliable guess where Wallroth's name must apply, it seems best not to attempt to revive it. Since *C. suecicum* is a new name for *C. calceum* sensu Bourd. & Galz., the

Lloyd specimen which they cite is a paratype, and was used to make certain the application of Litschauer's name.

*Corticium suecicum* is here discussed because it was referred by Bourdot & Galzin to *Corticium* sect. *Urnigera* and by Bondarzew & Singer, without renaming, to *Sistotrema*—and because its six-sterigmate basidia may lead mycologists to seek it in *Trechispora*.

TRECHISPORA CANDIDISSIMA (Schw.) Bond. & Sing. Ann. Myc. 39: 48. 1941.

TRECHISPORA TRACHYSPORA (Bourd. & Galz.) Bond. & Sing. Ann. Myc. 39: 48. 1941.

These two species, treated by Bourdot & Galzin in *Poria* [sect.] *Subtiles* (Hym. Fr. 656. [1928]), were transferred to *Trechispora* through misunderstanding of the characters of *T. onusta*. See p. 80 of this paper.

GALZINIA Bourdot, Assoc. Fr. Av. Sc. 45: 577. [1922]; Bourd. & Galz. Hym. Fr. 339. [1928].

Type: *G. pedicellata* Bourd.

Fructification resupinate, waxy-pruinose to mucous; basidia arising in loose clusters as vesicular bodies, developing a slender neck of variable and often great length and an inflated apical portion bearing 4 sterigmata; spores not germinating by repetition.

*Galzinia* differs from *Trechispora* in the consistency of the fructification, in the loosely clustered and often short-stalked immature basidia, in the variable and often extremely long basidial prolongation and its origin from either the end or the side of the basal vesicle, in the regular presence of only four sterigmata, and in other respects less readily described.

The position of the genus is uncertain. In his original description Bourdot assigned it a place near *Vuilleminia*, and it follows that genus in the Hyménomycètes de France. *Vuilleminia* is, however, probably not distinct from *Aleurodiscus*, and it seems unlikely that *Galzinia* is closely related to either. Bourdot commented also on the similarity of the shorter basidia of *Galzinia* to the *urnigera* type, to which their resemblance can be no more than superficial. It seems safe to leave the genus for the present in that great miscellany, the Thelephoraceae.

## KEY TO THE SPECIES

1. Hyphae without clamps; spores about  $7 \times 3 \mu$  ..... 1. *G. cymosa*.
1. Hyphae with clamps; spores larger ..... 2
2. Fructification mucous; spores  $8-11 \times 3-4.5 \mu$ ; gloeocystidia absent ..... 2. *G. pedicellata*.
2. Fructification waxy-pruinose; spores  $10-12.5 \times 4.5-5 \mu$ ; gloeocystidia present ..... 3. *G. occidentalis*.

1. *Galzinia cymosa* sp. nov.<sup>5</sup> (FIG. 12)

Fructification when fresh mucous-gelatinous, even or (in spots) granulose, of appreciable thickness, plumbeous (Light Quaker Drab R), when dry forming a barely perceptible dull vernicose film or entirely evanescent; all elements of the fructification embedded in gelatinous material and apparently contributing to it by gelatinization of their walls; hyphae without clamps, distinctly articulate,  $1.5-4 \mu$  in diameter, pseudo-dichotomous, the wall nearly or quite invisible, many segments with the distal end considerably expanded; filiform hyphal bodies arising among the basidia; basidia arising as irregularly claviform or narrow-ovoid bodies, producing a tubular outgrowth of uneven diameter and varied length, and at its summit abruptly expanded into a vesicle at first subglobose, later truncate, the whole  $18-38 \times 6-7 \mu$ , bearing (3-) 4 slightly divergent subulate sterigmata  $4.5-6 \mu$  long; spores curved, tapered toward both ends, obtuse,  $6.5-7 (-7.5) \times 3 (-4) \mu$ .

On firm wood of a fallen log of *Pinus rigida*.

Specimen examined: Massachusetts: woods east of Watershops Pond, Springfield, VIII.17.43, D. P. Rogers 1026, type.

The fructification, spread out for a length of over 7 dm. on the side of the log, was superficially indistinguishable from a vigorous growth of such Tremellales as *Helicogloea Lagerheimi*, *Sebacina podlachica*, and *Gloeotulasnella traumatica*. The peculiar method of branching, by which a hyphal cell gives rise at its distal end to a number of branches, paraphysoid bodies, or basidia, and after their disintegration may retain the scars of their bases, is quite like that shown in a number of Auriculariaceae, notably

<sup>5</sup> Fructificatio viva mucoso-gelatinosa, plumbea, sicca evanescens; hyphae zygo-desmatibus carentes,  $1.5-4 \mu$  diam., articulae, frequenter pseudo-dichotomae, tenuissime tunicatae; basidia primo claviformia vel anguste ovata, tubulum inaequale et longitudine varium gignentia, in vesiculum subglobosum ad apicem expansa, matura  $18-38 \times 6-7 \mu$ , sterigmata (3-) 4 subuliformia,  $4.5-6 \mu$  longit., ferentia; sporae curvulae, ad apices ambos attenuatae, obtusae, plurimae  $7 \times 3 \mu$ .

*H. Lagerheimi*, differing, however, in the larger number of branches often present. The effect of dichotomy is given when the first branch and the prolongation of the parent hypha are of the same size, and also when a pair of branches develop more rapidly than the main axis lying between them. The method of branching gives the present species a microscopic appearance strikingly different from that of the other species of *Galzinia*, and the immature basidia differ greatly in form. The similarities in texture, in basidia, and (probably only by coincidence) in spores are sufficient to justify the assignment of this species to *Galzinia* rather than to a genus of its own.

2. *GALZINIA PEDICELLATA* Bourdot, Assoc. Fr. Av. Sc. 45: 577. [1922]; Bourd. & Galz. Hym. Fr. 340. fig. 106. [1928]. (FIG. 13)

Fructification when fresh mucous, slightly pruinose, granulose under the binocular, very thin to fairly thick, when dry vernicose, subhyaline, except under considerable magnification completely invisible; hyphae with walls very thin (probably partly gelatinized), irregularly branched, with clamps throughout, 2-4  $\mu$  in diameter, irregularly inflated to 7.5  $\mu$ ; basidia in loose clusters, mostly on short stalks from which they are separated by a clamp, at first ellipsoid or pyriform, 8-11  $\times$  6.5-7  $\mu$ , forming from the apex or one side of this primary vesicle a prolongation 2.5-3  $\mu$  in diameter, of variable length, at maturity strongly inflated at the summit to 6-7  $\mu$ , the base sometimes partly shrunken, 4.5-5  $\mu$ , the whole 18-45  $\mu$  long, bearing apically 4 stout divergent sterigmata 3.5-5  $\mu$  long; spores curved subcylindric, of even diameter or widest near the apiculus, 8-11  $\times$  3-4.5  $\mu$ , germinating on the hymenium without formation of secondary spores.

On partly decayed logs of *Pinus contorta* and *P. pungens*; only on bare wood.

Two specimens seen, from Pennsylvania and Oregon.

The Oregon specimen of *G. pedicellata* shows all the variations in basidial form figured in Bourdot's excellent illustrations and a number of others even more bizarre. The neck which joins the primary vesicle to the summit is not, however, as narrow as there shown (described as 1.5-2  $\mu$ ); this discrepancy is probably the result of the employment of different techniques for expanding collapsed material, rather than of difference in the fungus



itself. The thinner specimen, from Oregon, shows most basidia with the apical part arising from the side of the basal; in the thicker and less fertile Pennsylvania specimen the basidia are mostly straight rather than geniculate.

3. *Galzinia occidentalis* sp. nov.<sup>6</sup> (FIG. 14)

Fructification thin, when fresh whitish pruinose, under the lens waxy-hypochnoid, when dry vernicose-pruinose, under the lens visibly composed of conglutinate whitish hyphae, and somewhat frost-like in appearance, or in thinner areas merely vernicose; mycelium with clamps throughout, 2-4  $\mu$  in diameter, partly collapsed, irregularly branched; gloecystidia arising among the basidia, thin-walled, colorless, with stainable content, finally empty, irregularly filiform, clavate, somewhat ventricose, or subcylindric, obtuse, 56-125  $\times$  6-11.5  $\mu$ ; basidia in irregular clusters or borne in series along the fertile hyphae, at first ovate, ellipsoid, or oblong, 11.5-16  $\times$  7-9  $\mu$ , developing an apical or lateral prolongation 4.5-5  $\mu$  in diameter above the basal vesicle, of variable length, finally strongly expanded to (6-) 7-9  $\mu$  at the summit, the whole basidium 23-53 (-100)  $\times$  6-9  $\mu$ , bearing 4 stout, strongly divergent sterigmata 7  $\times$  1.5-2  $\mu$ ; spores subcylindric, obtuse at both ends, very slightly curved or straight, (9-) 10-12.5  $\times$  4.5-5 (-6)  $\mu$ , frequently germinating on the hymenium by a hypha.

On wood of *Pinus contorta* and *Pseudotsuga mucronata*.

Specimens examined: Oregon: near Lebanon, Linn Co., IV.9. 1937, *D. P. Rogers* 371, **type**; Sutton L., near Florence, XI.26. 1937, *A. M. & D. P. Rogers* 431.

Distinct from *G. pedicellata* in the larger size of all organs, the straight, obtuse spores of even diameter, the relatively much thicker necks of the basidia, and the texture; even more surely distinguished by the gloecystidia, which may, however, be hard to find. *Galzinia occidentalis* is, chiefly because of its texture, a species less distinctive among the lower basidiomycetes than

<sup>6</sup> Fructificatio tenuis, albo-pruinosa, sub lente ceraceo-hypochnoidea, sicca e hyphis conglutinatiss operte constituta, vel ceracea; hyphae nodoso-septatae, 2-4  $\mu$  in diam.; gloecystidia hyalina, irregulariter subcylindracea vel linearia-obtusa, 56-125  $\times$  6-11.5  $\mu$ ; basidia in fasciculis aggregata vel seriatim et separatim ordinata, primo ellipsoidea, oblonga, vel ovata, 11.5-16  $\times$  7-9  $\mu$ , per appendicem longit. variabilem, diam. 4.5-5  $\mu$ , producta, matura 25-53 (-100)  $\times$  6-9  $\mu$ , ad apicem usque ad (6-) 7-9  $\mu$  inflata, sterigmata 4 crassa, 7  $\times$  1.5-2  $\mu$ , gerentia; sporae cylindraceae, nonnumquam leviter curvulae, utrinque obtusae, (9-) 10-12.5  $\times$  4.5-5 (-6)  $\mu$ .

its congeners, but there seems no reason to hesitate in assigning it to *Galzinia*. Basidia 100  $\mu$  long were recorded when the fresh material was studied; none of this size have persisted after drying.

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#### EXPLANATION OF FIGURES

All figures were drawn from KOH-phloxine preparations with camera lucida at 2000 $\times$  and reduced in reproduction to 1000 $\times$ . FIG. 1, *Trechispora onusta*: a-c, type; d-h, Bresadola 86. FIG. 2, *Trechispora Raduloides*: Martin 4871. FIG. 3, *Trechispora muscicola*: Bourdot 15202 (f, g, ampulliform clamps). FIG. 4, *Trechispora subtrigonosperma*: type (c, spore in profile; d, spore in face view). FIG. 5, *Trechispora diademifera*: a-e, D. P. R. 1004; f-h, D. P. R. 1001. FIG. 6, *Trechispora coronifera*: a-d, D. P. R. 1000; e-g, type (d, g, gloeocystidia). FIG. 7, *Trechispora Sernanderi*: paratype (a, one sterile and two immature basidia; d, gloeocystidium). FIG. 8, *T. Brinkmanni*: a-d, D. P. R. 1007; e-i, D. P. R. 1009. FIG. 9, *Trechispora Hirschii*: D. P. R. 963. FIG. 10, *Corticium niveo-cremeum*: a, b, D. P. R. 1014; c-e, D. P. R. 1016. FIG. 11, *Corticium suecicum*: TRT 8489. FIG. 12, *Galzinia cymosa*: type (e, with paraphysoid body). FIG. 13, *Galzinia pedicellata*: D. P. R. 444 (g-i, spores germinating on the hymenium). FIG. 14, *Galzinia occidentalis*: type (g, gloeocystidium).

## STUDIES IN NORTH AMERICAN RUSSULAE

GERTRUDE S. BURLINGHAM

(WITH 2 FIGURES)

First, what characteristics should be used in distinguishing species? All will probably agree with the specific importance of those gross structures of pileus, stipe and lamellae upon which Elias Fries based his separation of species in Hymenomycetes Europaei. Since that time the value of exact spore color as seen in a fresh dense spore print, and the spore ornamentation as brought out with iodine solution under a high power magnification have come to be known. How much importance should be put upon chemical composition and chemical reactions? Certainly if the reactions of certain chemical reagents are to be used in distinguishing species, the *natural* chemical content of a species must be given equal value in determining a species. Take as example the *acid taste* of the context. I have found this to be constant in a species at the same stage of development unless washed out by rains. In some species the acidity may be found only in the young, perhaps only when tasted fresh in the field. It may be present in the cuticle only, or in the lamellae or throughout the context. But wherever it may be, it will always be found in the same stage and structure when tested in fresh specimens in the field unless, as previously stated, rains may have rendered them water soaked or have washed out the taste, especially in the cuticle. The importance of tasting all parts and stages of fresh specimens in the field has often been overlooked or neglected.

Also the *odor* in both fresh specimens and of those drying is of equal importance. Since this sometimes develops only with age or in drying and does not persist in the dried specimens, one must be familiar with species in both conditions. One who proposes to describe species in this genus must also have a keen sense of smell! Had Elias Fries been able to detect the odor of *Russula xerampelina* there would have been less confusion regarding that

species. Odor like the taste of a species is due to some chemical content and therefore should be considered a factor in separating species.

While among the red *Russulae* there is considerable variation of color in a species, nevertheless there is a certain limitation in this variation, so that as a whole it may be taken into consideration. Any change in color in the broken flesh or with age or in drying may be considered as chemical in nature due perhaps to some oxidizing ferment as in the *Lactariae*. The rapidity of this change may depend upon the age of the plant, but careful observation will detect it.

Therefore these three characteristics, taste, odor, and color changes, must be given equal importance with gross structural characters in the distinction of species.

Concerning the shape, size and ornamentation of spores, the first essential is a good authentic spore print. And in case of an undescribed species it is well to label the specimen from which the print was made. Unless species are kept separate in collecting and in drying there may be spores from other species on the lamellae. If sufficient precaution is taken the variation in the pattern of the spores will be due to difference in maturity or in position. By this I do not mean that any two spores will be identical in markings, but the general pattern will be the same, not varying from one extreme to another. By taking spores from a print there will be less danger of having immature spores under observation. In closely related species in a group there may be a resemblance in pattern, but still a difference. Crawshaw's method of showing several spores with the description on the same page at one side is excellent<sup>1</sup> as it renders easy and quick comparison, thus aiding in the determination of the species at hand.

In Mycologia 34: 66. 1942, and 35: 142. 1943, Dr. Rolf Singer has taken up in some detail type studies of some of the *Russulae* described from the United States. While with many of his conclusions I can agree, concerning others I must differ. In his study of *Russula dura* Burl. he was correct in considering it near if not the same as *Russula ochroleuroides* Kauff. From

<sup>1</sup> Spore ornamentation of the Russulas, R. Crawshaw.

the first collection in 1921 except for one small specimen I did not find the species again until August 1939 when it occurred in some quantity in woods about one-half mile from the type collection. Upon comparing it with a type specimen of *Russula ochroleucoides* I found it to be the same as that species and therefore *Russula dura* becomes a synonym of that species. It should be noted that the taste is first sweetish, then bitterish, unpleasant, aromatic and cooling. The odor is detected as a flavor in tasting rather than by smelling the mushroom.

In Mycologia 31: 497. 1939 I gave the new name *Russula insignita* to *Russula insignis* Burl. since the name had been used by Quélet for another species, adding also further notes and spore drawings to show the ornamentation. However shortly before the publication of this Dr. Singer had given it the name of *R. Burlinghamiae*.

While *Russula blanda* Burl. is known only from the type locality, it was collected on July 23 and 27, 1912, and again on September 18, 1915. From *Russula lactea* Fr. it differs in its fragile texture, white spores, thin, close, slightly decurrent lamellae. It therefore belongs in a different group than the European *Russula lactea*. The spore ornamentation was shown in figure 5, Mycologia 31: 491. 1939, with the description on page 498.

Since the spores of *Russula pulchra* Burl. and *Russula perplexa* Burl. have not been shown with their ornamentation they are illustrated in figures 1, *a* and *b*. Those of the former are on the average  $7.5 \times 8.75 \mu$  exclusive of the apiculus. Under the 1/6 power they appear very echinulate and the protuberances are not all of the same length. They seem uniguttulate or duoguttulate. With iodine and the oil immersion lens fine lines are seen connecting some of the protuberances. The spores of *Russula perplexa* vary from  $7.5 \times 8.75 \mu$  to  $8 \times 9 \mu$  exclusive of the apiculus. The protuberances are visible under the 1/6 power and also vary in size. With iodine very fine lines appear connecting some of these. The color in a fresh spore print is white. Even now 27 years later the color is fleshy-white tone 1. Mr. Davis described the color of fresh spores of *Russula pulchra* as "just off

white." Now the print is flesh color 67 tone 2, slightly darker than the cream white of the fresh print.

*Russula sulcatipes* Murrill can scarcely be a form of *Russula Mariae* Peck since the stipe is milk white and glabrous while that of the latter is usually at least through the central part concolorous with the pileus and adorned with glandular-like dots. When it is rarely white it still has the same surface covering, appearing pruinose under less magnification. The cut flesh of *Russula Mariae* has a slight but characteristic odor and is somewhat sticky. The spores are very characteristic both in the globose shape and banded appearance. Although spore drawings were shown in figure 6 B, *Mycologia* 28: 265. 1936, another drawing is shown in figure 1, c showing the contrast with the spores of *Russula sulcatipes*, fig. 1, d. The spores from which this figure was made were taken from type material. They are not globose unless viewed on end and have tuberculate protuberances of different sizes. When the iodine stain has been washed out the tubercles and faint fine lines connecting many of them remain in blue. I find the size to vary from  $6.87$  to  $7.5 \mu \times 8-10 \mu$ .

In *Mycologia* 28: 265. 1936 I reported *Russula vesca* from Oregon, and called attention to the fact that *Russula brunneola* Burl. was a synonym of that species. It occurs abundantly in Vermont, and had the species not been included by Fries with the *Heterophyllae* in all of his Latin publications it would undoubtedly have been reported from various states. From *Russula vesca* Fries *Russula flocculosa* Burl. differs not only in the distant lamellae and spore ornamentation but in the absence of the radiating veins and rugose condition of the surface of the pileus. The floccose almost tomentose condition of the surface of the pileus remains even at maturity. The spore ornamentation was shown in figure 6, *Mycologia* 31: 491. 1939.

In *Russula Davisii* Burl. we find gross structural characteristics separating it from *Russula olivacea* (Schaeff.) Fries. If we accept Fries's description of the species, the surface of the pileus is silky and squamulose, the margin even, and the color varies from sordid purple to olivaceous or entirely fuscous-olivaceous, while the lamellae have shorter intermixed with forking ones, and the

flesh changes to yellow. In *Russula Davisii* the pileus is pruinose to glabrous with the margin striate-tuberculate, and the lamellae are equal, forking at the stipe and inclined to be decurrent. Mr. Davis described the flesh as white and white under the cuticle, and since he was a careful observer I believe he would have discovered if the flesh had changed to yellow. In fact where the cuticle had been removed the flesh does not show any more change than the normal drying of white flesh would show. He described the color as Pinard yellow (R). There is no trace of purple or olivaceous in any of the specimens. Regarding the stipe he wrote in his field notes, "Stem has not discolored enough to write about." In the dried specimens the stipe does show a slight discoloration. He gave the spore color yellow ochre rather than ochraceous and the print now is only yellow ochre 326 tone 2. The pattern differs according to position as the figure shows (FIG. 1, e). The spores are not globose except when viewed more or less on end. Dr. Kauffman in his *Agaricaceae* of Michigan, p. 145, calls attention to the fact that in Europe *Russula olivacea* is a debated species. Hence is it not best to adhere to the description given by Fries of unequal lamellae and silky-squamulose pileus with which gross characters *Russula Davisii* does not agree, and for the present consider this a valid species? The type is number 1 Aug. 7—1916—Davis. It may be well here to state that in collecting Mr. Davis limited himself in any one trip to the few species which he could carefully study in the fresh condition.

It is difficult to consider *Russula Murrillii* Burl. identical with *Russula punctata* Krombh. to which Singer refers it. According to the description by Krombholz the surface of the pileus is glabrous, viscid, shining, with the margin sulcate. From this *Russula Murrillii* differs in a pruinose surface becoming pruinose-floccose, a dull appearance and even margin. Krombholz describes the stipe of his species as slightly enlarged at the base, white or white becoming yellowish while that of *Russula Murrillii* is chalk white and unchanging in drying and equal. The context of the latter is thin while the pileus of *R. punctata* is described as thick. As to whether *Russula punctata* Krombh. is synonymous with *Russula amethystina* Quél., in the absence of exsiccati



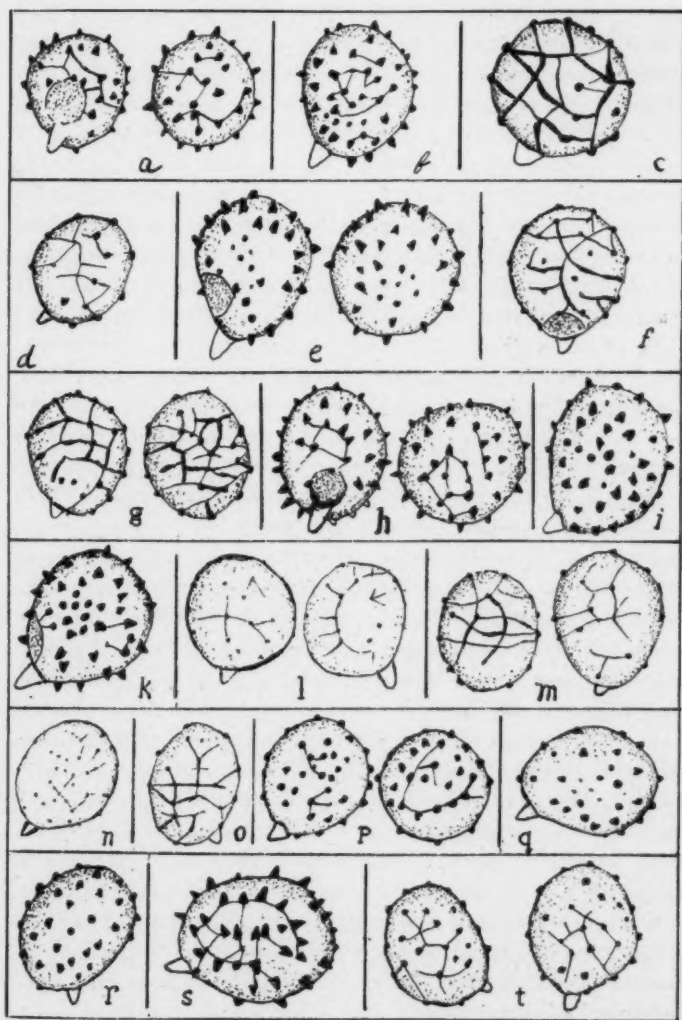


FIG. 1. a, *R. pulchra*; b, *R. perplexa*; c, *R. Mariae*; d, *R. sulcatipes*; e, *R. Davisii*; f, *R. Murrillii*; g, *R. mordax*; h, *R. squalida*; i, *R. serissima*; k, *R. fucosa*; l, *R. cinerascens*; m, *R. Burkei*; n, *R. magnifica*; o, *R. polyphylla*; p, *R. flaviceps*; q, *R. variata*; r, *R. simulans*; s, *R. praeumbonata*; t, *R. vesicatoria*.

of types, the original description must decide. Quélet describes the stipe of his species as narrowed at the base, pruinose and white in contrast with the thickened base and white to yellowish of that in *R. punctata*. He describes the pileus as mealy with white tender sweet slightly fragrant flesh, and the lamellae as adnate, jonquil then primrose colored. Krombholz gives the lamellae of *R. punctata* as free, distant and ochraceous. The color of his illustration does not resemble the description of the color of Quélet's species. Julius Schaeffer gives the color of the spores of his interpretation of *R. amethystina* as ochre. The spores of *Russula Murrillii* are pale yellow and are more egg shaped than those of *R. amethystina* shown by Julius Schaeffer. They have blunt tubercle-like protuberances connected by lines (FIG. 1, f). Until further collections of this species reveal taste and odor and furnish a satisfactory spore print, it is best to retain the name *Russula Murrillii*.

*Russula mordax* Burl. is separated from *Russula badia* Quél. first by the chemical qualities which render it instantly peppery and by the lack of odor. Regarding the taste of *R. badia*, both Singer and Schaeffer describe it as first mild. Schaeffer writes, taste long evidently mild, after a longer time, often a minute, intolerably sharp and persisting. Regarding the odor he says, one with a good nose need not burn the tongue. Hence it would have been probable that the odor would have been detected since I am on the lookout for the odor of any species. Quélet describes the color of the spores as citrine which is much brighter and lighter yellow than either Singer or Schaeffer note, and brighter than the color of the spores of *Russula mordax*. Fifteen years after collecting, the spore print remains ochroleucous. The spores are also smaller and the spines while connected are not so much in ridges as shown in the spores of *R. badia*, Table 27, 8-e of Schaeffer's Monographie. Quélet states that *Russula badia* resembles *Russula xerampelina*. This is not true regarding *Russula mordax*. Until further collections reveal that this species has an odor (douce Quél.) and a mild taste preceding the acidity, sinuate lamellae and larger spores it would seem better to retain *Russula mordax* as a distinct species. Spores are shown in figure 1, g.

The *xerampelina* group of *Russulae* is at present one of the most puzzling. Singer and Schaeffer put under one species all of those having the characteristic fishy odor regardless of acidity, color of lamellae and spores, and spore pattern. Julius Schaeffer in his *Russula* Monograph, p. 373, states that occasionally the young lamellae of *Russula xerampelina* are somewhat sharp to sharp, soon fully mild (Junge Lam. gelegentlich schärflich bis scharf, bald völlig mild) and the pattern of the spores variable according to variety (Im Relief variabel nach den varietäten). The first step to be taken in solving the puzzle is to ascertain if the young lamellae of the *Russula xerampelina* of Fries are peppery.

We have growing in spruce woods in Vermont and as Kauffman reported in coniferous woods in Michigan the typical *Russula xerampelina* Fries with the reddish stipe and the same coloration of the pileus as that which I saw growing in Sweden. Kauffman considered *Russula squalida* Peck as having less firm consistency and a white stipe. "Hundreds of individuals were examined about Ann Arbor and all had white stems, never red."<sup>2</sup> Peck also described the stipe as white and equal, while that of *R. xerampelina* is not only more or less reddish but is club shaped. The spores of *R. squalida* are smaller, varying from  $7-8.75\ \mu \times 8.75-10\ \mu$ . They are echinulate with fine lines connecting the base of the echinules occasionally. These are difficult to see (FIG. 1, h).

*Russula serissima* Peck resembles *R. squalida* much more than it does *R. xerampelina*, but the taste when young is peppery and the spores are larger varying from  $8.75 \times 10\ \mu$  to  $9.37 \times 13\ \mu$  (FIG. 1, i).

*Russula fucosa* Burl. is plainly distinct in its much paler spores and small size, the slow and less deep discoloration of the flesh and lamellae. In ten collections made on Newfane Hill, Vt., during the past two summers I have found that in the button stage the taste is slowly but plainly peppery. The spores (FIG. 1, k) are flesh color 67 t 3-4 while those of *Russula xerampelina* Fries are maize tone 3-4. The average size of the adult spores is from  $8.75 \times 8.75\ \mu$  to  $8 \times 10\ \mu$ . They are coarsely echinulate

<sup>2</sup> The Agaricaceae of Michigan, p. 146.

with the protuberances varying in size and sometimes crowded, and rarely with a few fine lines. Unless it should be found that all young of *Russula xerampelina* Fries are acrid, certainly *Russula serissima* Peck and *Russula fucosa* Burl. should be considered distinct species. And the mild form with the constantly white stipe and less compact texture can easily be distinguished as *Russula squalida* Peck.

Regarding *Russula cinerascens* Beards., Mr. Beardslee wrote to me previous to the publication of the species, "I have been watching this species all summer." Had there been an acrid taste he would have discovered it. On the other hand, Dr. Burke readily found that his species was acrid in taste. The spores of *Russula cinerascens* appear nearly smooth under oil immersion until the iodine stain is used when the protuberances barely show on the circumference and are very minute over the surface, some being connected by very fine lines (FIG. 1, *l*). Those of *Russula Burkei* are plainly tuberculate and more reticulate (FIG. 1, *m*). On the basis of the acidity and the presence of an odor which Burke considered similar to that of *R. foetens* and the difference in spore markings regardless of any other differences this species would seem to be distinct from *Russula cinerascens*. Both species were described from southern states. Dr. Singer reports that he found *Russula Burkei* in New Hampshire. I have not seen these specimens.

Carleton Rea in his British Basidiomycetes describes the spores of *Russula luteotacta* Rea as white. He considered that Bresadola's identification of specimens as *Russula sardonina* Fries was incorrect and that they belonged with *R. luteotacta* Rea. Bresadola had given the spore color as hyaline. Julius Schaeffer considers the spores as almost white, paler than B of Crawshay's colors. In the Revision der Russula-Sammlung Romels by Julius Schaeffer published in 1939, he reports on page 53 *Russula luteotacta* which Romell had finally called *Russula rosella* in his herbarium. Among the water color illustrations which he cites is number 2147 without exsiccati. In my herbarium I have various specimens which Romell sent me, among which is this number 2147. On this packet he wrote, "*Russula rosella* in Herb. Stockholm, 10 Aug. 1902, in Frondose Park, fig. 2147,

spores pure white, pileus pure roseus, all parts turn yellow when touched, taste acrid." Mr. H. C. Beardslee who collected with Lars Romell has told me that Romell would not attempt to identify a *Russula* unless he had a 24 hour spore print! Hence we may accept Romell's statement that the spores of this species are white, in verification of Rea's description of the spore color. The specimens plainly show the change of stipe and parts of the pileus and lamellae to yellow. The spores of *Russula mexicana* Burl. which Singer considered to be *Russula luteotacta* Rea are pale yellow. Had the species been *R. luteotacta* Rea, Dr. Murrill could scarcely have avoided noticing the change to yellow which would have occurred in all parts where touched, and the adult specimens in the herbarium should show the changes. These two species illustrate the importance of complete field notes regarding either change or lack of change in the color due to bruising or cuts, and a dense spore print with the color when fresh matched by some standard color chart. The most satisfactory color charts are Color Standards and Nomenclature by Robert Ridgeway, and the Repertoire de Couleurs published by the Société Française des Crysanthémistes.

Due to restrictions in automobile travel, I have been unable to collect again *Russula rubrotincta* which grows in spruce woods in Stratton, Vermont, and check once more the taste of young specimens in all parts. But until I can find that some parts at some stage of development are acrid, I cannot consider it synonymous with *Russula paludosa* (*Russula elatior* Lindb.). I have collected the latter and found no difficulty in detecting the acrid taste. Peck first gave *rubrotincta* as a variety of *Russula integra* (L.) Fries. I have not found *Russula rubrotincta* growing in sphagnum swamps, which seems to be the habitat of *Russula paludosa*.

In my treatment of the genus *Russula* in North American Flora the American Code of Nomenclature was followed by which the earliest name for a species was used in case it had not been preempted. Since Batch had used the name *Agaricus olivascens* for another species in 1783 it was considered that *Agaricus olivascens* Secr. 1833 would need to be replaced by another name; hence the new name *subolivascens* was substituted in the com-

bination *Russula subolivascens*, and *Russula olivascens* Secr. was reduced to synonymy. In following the International Code the name given by Secretan would be retained as Dr. Singer states. Throughout the treatment of the genus *Russula* in North American Flora the American rules were followed. Moving forward the date for the acceptance of the name of a species certainly reduces the labor of finding what name is to be taken as the original, although in some cases it deprives the original discoverer of the species of his due honor. But it does reduce the danger of including under a species forms which do not belong there, and eventually describing under the name species very different from what the author had under observation. All of this difficulty however can be obviated by the preservation of type exsiccati. From now on in order to render the description of a new species valid, type specimens together with a satisfactory spore print should be deposited in some central herbarium in the country from which the species is described. If specimens are thoroughly dried, they can be preserved indefinitely either in screw topped glass jars or tightly covered tin boxes made in standard sizes for filing. The only danger then will be from mold which can be obviated by keeping the atmosphere dry in the herbarium room. Each specimen must be labeled so that it cannot be mixed with others. As far as material will permit authentic cotype or extype exsiccati should be deposited in the herbarium, in other leading Botanical Gardens or Colleges where mycological work is being done. Especially should this be done in the United States so that we may avoid the confusion of species which exists in Europe, and the mention of a species "in the sense of" this author or that one. Except in case of a species described in error as new, which would then become a synonym, a determination wrongly made should be dismissed as false and the species placed in its proper classification if data allow it to be correctly identified.

The descriptions of *Russula magnifica* Peck and *Russula polyphylla* Peck resemble each other, but since the latter had been described only five years previously, he undoubtedly considered it when describing *R. magnifica*. The most pronounced difference in gross structure is the very close arrangement of the lamellae in *R. polyphylla*. The spores of *R. magnifica* are more broadly



elliptical and appear nearly smooth under the 1/6 magnification. With the iodine stain and oil immersion they are seen to have small dot-like protuberances some of which seem to be arranged very close together in a row and occasionally they seem to be connected by almost invisible lines (FIG. 1, *n*). The spores of *R. polyphylla* are unsymmetrical, and a little longer in proportion to width, and have larger and fewer protuberances connected by lines rendering them reticulate (FIG. 1, *o*). With these two species we must also consider the difference in the type locality. While *R. magnifica* was found in sandy woods under *Kalmia* at Port Jefferson, N. Y., near Long Island Sound, the other was found ten degrees of latitude farther south, and inland. It is possible that the range of the two species does not overlap.

Some time ago when I attempted to make a critical study of the spores of *Russula flaviceps* Peck, I found that the type specimens had evidently been lost or at least misplaced. In mounting or boxing specimens, which is usually done by an assistant, it is very easy to mix or misplace specimens unless they are so labeled as to make this impossible. Even a type may thus be lost. Having known Peck and his work as I did, I cannot think that it was possible that such a careful collector and thorough student of this genus should have taken specimens of *Russula flava* as the type of *Russula flaviceps*. This condition emphasizes the need of attaching to each specimen in a type collection a label which will remain. Even in the absence of the type Peck's description is clear enough for the identification of the species. I have in my herbarium a collection from Newfane Hill, Vt., on July 21, 1919, and painted by Miss Ann Hibbard, also number 28—1920, the specimens of which agree perfectly with his description. The spores are ochroleucous in a dense print, plainly echinulate under the 1/6 power, subglobose to broadly elliptical,  $6.87 \mu \times 7.5-8.1 \mu$ , with tubercle-like protuberances and very fine lines connecting some. Especially after the iodine has been washed out these and the protuberances remain in blue (FIG. 1, *p*). The taste in flesh and lamellae is mild, soon slightly peppery. In older stages the taste may be entirely mild. It must not be confused with *Russula aurantialutea* Kauff. which has ochre lamellae and spores with a different ornamentation and in all



parts at all times a very acrid taste. Peck states that the species was rare and I have not found it common.

N. M. Glatfelter who sent the specimens to Peck from which he described *Russula eccentrica* later sent me one good specimen said to be from type material. In the dried condition it seems quite distinct in its rather distant reddish brown fairly broad lamellae with shorter ones intermixed. They are more distant than those of *Russula compacta* and the pileus does not seem as thick as does that of the latter. Unfortunately the taste was not recorded. Since the specimens were collected in a ravine the eccentric shape may prove to be incidental. The spores are nearly globose and under the 1/6 power appear nearly smooth. With iodine stain and higher power they are seen to have scattered dot-like protuberances. They are white and vary in size from  $5-7 \mu \times 6-8 \mu$ .

I cannot consider that *Russula variata* Banning & Peck is an acrid form of *Russula cyanoxantha* (Schaeff.) Fries as Dr. Singer suggests, first because I believe that acidity is a fundamental chemical characteristic which serves to distinguish a species from one which is mild, and secondly because the arrangement of the lamellae is different in the two species. In *Russula variata* the lamellae are narrow or in large specimens comparatively narrow, narrowed at each end, and dichotomously forked without short ones intermingled. Beginning at the stipe the lamellae will fork from two to three times before reaching the margin. In *Russula cyanoxantha* according to Fries, the lamellae are broad with shorter ones intermingled. In his painting he shows the forking next the stipe or part way to the margin. There seems to be no question that the taste is mild. Singer so describes it, and Julius Schaeffer calls it fully mild (Völlig mild). The resemblance between the two species is chiefly in color variation of the pileus, and because of that similarity it is possible that some collections of *Russula cyanoxantha* may have been wrongly determined as *Russula variata* and have slipped into unverified collections in some herbaria. Our nearest species which might be mistaken for one or the other of these species is *Russula simulans* Burl., another acrid species but with unequal lamellae, forking once. It is doubtful whether *Russula variata* is ever

mild. This summer I have made several collections and in every case the taste was acrid even in one which was collected at the end of 36 hours of a series of showers. The spores are somewhat elongated in a lateral view, and vary from  $7.5-8.75\ \mu$  by  $10-11.25\ \mu$ . They have blunt protuberances of various sizes, some very small. They are mostly distinct but sometimes close enough together to appear almost connected. After the iodine stain has been washed out a few cobweb-like lines may appear connecting the bases of a few protuberances (FIG. 1, *q*). But the pattern seems to differ from that shown for spores of *R. cyanoxantha* shown by Julius Schaeffer in his Monograph t. 27, figure 3A. The ornamentation shown in figure 1, *q* is that of the average spore. Figure 1, *r* is a lateral view of a spore of *Russula simulans*. The protuberances are slightly larger than those on the spores of *Russula variata* and there are fewer dot-like ones. These spores illustrate the fact that in the same group there is likely to be a resemblance in pattern as has been stated. A spore drawing was also shown in Mycologia 13: f. 2, 131. 1921.

Since the spore of *Russula praeumbonata* in Mycologia 13: f. 5. 131. 1921 was not drawn from one stained with iodine, the ornamentation brought out by that method is shown in figure 1, *s*.

The microscopic study of cystidia, basidia and structure of the pileus is of great scientific value, and Dr. Singer is to be commended for his excellent work in his review of types. While helping in the group placement of species it may also sometimes assist in the determination of the species. But then some chemical or gross structural characteristic can undoubtedly be noted which will enable one to identify the species without this critical microscopic work.

The beauty of many species of *Russula* attracts some with an artistic ability to the study of the genus. Mrs. E. B. Blackford and Miss Ann Hibbard made many water color sketches which have been preserved in Boston. In addition Miss Hibbard spent several summers on Newfane Hill making water colored paintings of *Russulae* which she presented to me. In recognition of their work we have *Russula Blackfordae* Peck and *Russula Hibbardae* Burl. The water color drawings of fungi done by George E. Morris are preserved in the Peabody Museum of Salem, Mass.

The edible qualities of many species of *Russula* also have attracted others to the study of the genus, and they too have added to the knowledge of the genus. Hence it is desirable that in so far as possible the identification of the species should be made simple and exact with the aid of a hand lens only.

***Russula vesicatoria* sp. nov. (FIG. 2; 1-*i*)**

Pileus fleshy, firm, umbilicate with inrolled margin, finally spreading with depressed center, up to 11 cm. broad; surface white tinted maize yellow tone 1 to chamois tone 4 in the center, slightly viscid on the margin when wet, soon dry, cuticle adnate except on the edge, dull, often finely areolate over the central area; margin even, pruinose-downy under the lens, remaining inrolled on the extreme edge up to maturity; context white, unchanging, astringent to bitterish, slowly acrid but increasing and lasting and burning, odor strong but pleasant, somewhat like that of fresh *Lactaria camphorata*; lamellae fleshy white, unequal, some forking near the stipe or part way to the margin, narrow at the inner end, rounded at the outer end, very close; stipe white, very solid, tapering downward, somewhat pruinose downy at the apex, 2.2 cm.  $\times$  2.2 cm. at the apex to 1.5 cm. at the base; spores fleshy white 9 tone 4 to flesh color 67 tone 1 in thick mass, appearing echinulate under the 1/6 power, but under the oil immersion with stain showing fairly large protuberances with fine lines connecting some,  $6.8\text{--}7.5\ \mu \times 8.37\text{--}8.75\ \mu$ .

Pileo carnosio, firmo, umbilicato, margine incurvato, pruinoso-puberulo sub lente, postea expanso et centro depresso, albo, postea disco albidulo aut pallidoluteolo, margine cum udus est viscidulo, mox sicco, exstrio, centro cum exoletum est saepe areolato, 6-11 cm. lato; carne alba, astricta, amara, tum tarde acri, postremum et diu acerrima, subolida cum fracta est; lamellis albidulis, inaequalibus, furcatis, angustis, confertis; stipite albo, solido, ad apicem minute pruinoso-puberulo, constricto deorsum; sporis albidulis (9-t4 aut 67 t1), echinulatis, et lineis delicatis reticulatis,  $6.87\text{--}7.5\ \mu \times 7.5\text{--}8.37\ \mu$ .

TYPE LOCALITY: Near Lake Wildmere, Longwood, Florida.  
Type 1—Oct. 23—1941.

HABITAT: In black humus of lawn under scattered pines.

DISTRIBUTION: Longwood and near Apopka, Florida, also Davis Island, North Carolina.

This species belongs in the section *Compactae*, hence resembles the *Lactariae* but latex is lacking in all its stages and conditions. It has appeared regularly during the autumn when rains were favorable and Mrs. Nichols in whose lawn it grows says that it



FIG. 2. *Russula vesicatoria* Burt.

also appears in summer. The taste is quite distinctive in that it first seems mild and somewhat bitterish, then acrid. The acridity remains on the tongue and lips for over twenty-four hours and finally results in blisters on lips and white-tipped tongue. Mr. H. C. Beardslee, who collected it on Davis Island, N. C., and also at Longwood, Fla., says, "I blistered my lips very thoroughly with it." The odor becomes apparent when the surface of the pileus is rubbed or scraped, or the mushroom is cut. It resembles somewhat the odor of fresh broken *Lactaria camphorata*, but the odor does not remain in drying. This odor and the very close narrow lamellae and firm structure of the pileus and stipe together with the nearly white color will serve to distinguish it when one once knows the mushroom, thus avoiding the necessity of tasting with its ill effects.

Type specimens are in my herbarium and co-type specimens in the herbarium of the New York Botanical Garden.

I wish to express my thanks to Prof. Arthur T. Walker of the University of Kansas for editing the Latin description of this species.

## NOTES AND BRIEF ARTICLES

### PLANT LIFE AND THE LAW OF MAN

The October number of *The Botanical Review* (9: 483-592) consists of "a history of legislation and litigation in the United States respecting eradication and quarantine of alternate hosts in the control of three heteroecious-fungus diseases—black stem-rust of wheat, white pine blister-rust and apple rust" by Dr. Edmund H. Fulling, Editor of *The Botanical Review*. The author has made an exhaustive study of the subject and presented the results in such a form that it is not only instructive, but exceedingly interesting reading. Separate numbers may be secured if desired.—FRED J. SEAVER.

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### A DICTIONARY OF THE FUNGI

The above named volume by G. C. Ainsworth and G. R. Bisby has just come to our desk. It comprises a list of the names of all genera of the fungi (not including bacteria and lichens) up to 1939; also the order to which the genus belongs, with the approximate number of species and their distribution. It is also a glossary of mycological terms and contains keys to families of the fungi. The generic names are used in agreement with the International Rules of Nomenclature so that unwarranted changes in the spelling or use of the name is not recognized.

The volume, consisting of 359 pages and 138 figures, is neatly bound. It is a most usable work, and a great time saver. This volume should be on the desk of every professional mycologist, as well as that of the amateur. It is to the mycologist what *Willie's Dictionary* is to the student of flowering plants and ferns.—FRED J. SEAVER.

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### A FEW CORRECTIONS

When one attempts to describe over six hundred new fungi without adequate herbarium and library facilities he is bound to

make mistakes. The collection of new material, also, and new publications will often change one's viewpoint. Then there are always friends to aid with valuable suggestions. Dr. Rolf Singer has been especially helpful in this way. He is responsible for at least eight of the corrections in the following list:

*Agaricus auricolor* Murr. = *Agaricus cylindriceps* Murr.

*Agaricus Weberianus* Murr. = *Agaricus Rhoadsii* Murr.

*Atlyospora atomacea* Murr. = ***Naucoria atomacea*** Murr. comb. nov.

*Boletus viridiflavus* Coker & Beers = *Boletus flavimarginatus* Murr.

*Cerionomyces flavissimus* Murr. = *Cerionomyces aureissimus* Murr.

*Cortinarius praefelleus* Murr. = *Cortinarius prae brevipes* Murr.

*Cortinarius sublargus* Murr. = *Cortinarius largiformis* Murr. comb. nov.

*Cortinarius Westii* Murr. = *Cortinarius prae brevipes* Murr.

*Geopetalum albissimum* Murr. = ***Crepidotus albissimus*** Murr. comb. nov.

*Gymnopus alliaceus* Murr. = *Armillaria Boryana* (Berk. & Mont.) Murr.

*Gymnopus mammillatus* Murr. = *Gymnopus albistrictus* Murr.

*Gyroporus Rhoadsiae* Murr. = ***Tylophilus Rhoadsiae*** Murr. comb. nov.

*Hydnium virginianum* Murr. = *Sarcodon reticulatus* Banker

*Lactaria floridana* Beards. & Burl. = *Lactaria villosa* Clements

*Lactaria praeseriflua* Murr. = *Lactaria luteola* Peck

*Lactaria torminosa* Auct. Am. = *Lactaria villosa* Clements

*Lentodium floridanum* Murr. = ***Armillaria squamosidisca*** Murr. comb. nov.

*Lepiota trunciola* Murr. = *Lepiota subdryophila* Murr.

*Lepista prae villosa* Murr. = ***Inocybe prae villosa*** Murr. comb. nov.

*Marasmius squamosidiscus* Murr. = ***Armillaria squamosidisca*** Murr. comb. nov.

*Melanoleuca sublata* Murr. = ***Lactaria sublata*** Murr. comb. nov.

*Melanoleuca subrimosa* Murr. = *Melanoleuca entoloma* Murr.

*Russula lepidiformis* Murr. = *Russula lepida* Fr.

*Stropharia alachuana* Murr. = *Agaricus Rhoadsii* Murr.

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